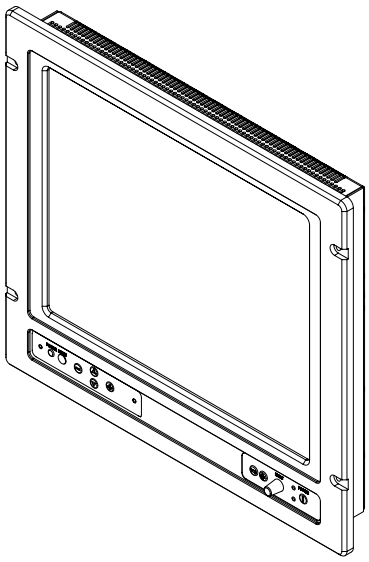
HATTELAND®
DISPLAY

USER MANUAL



Naval Multi Display Models

JH 20T03 MIL - 20.1 inch Military Display (MIL)

User Manual MIL Series	
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Please visit www.hatteland-display.com for the latest electronic version of this manual.

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WARNING: This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

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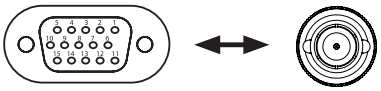
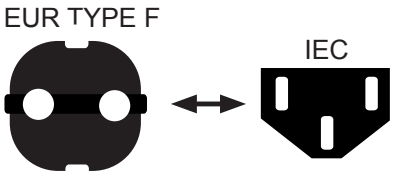
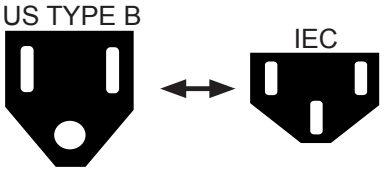
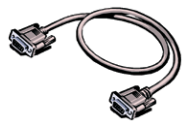
Contents of package

This product is shipped with:

Item	Description	Illustration
	4 pcs of PAN M6X25 black bolts with M6 plastic washer. **These should only be used to secure the display into a console.** *Note: If you prefer your own bolts, make sure they are minimum M6 and 25mm in length for security reasons.*	
	1 pcs of Standard BNC Signal Cable. DSUB 15P Male to BNC 5P Male - Length: 2.0m	
 FS-CABLE EU	1 pcs of power cable European Type F “Schuko” to IEC. Length 1.8m	
 80099	1 pcs of power cable US Type B plug to IEC. Length 1.8m	
 MEDIA STD01	1 pcs of Documentation and Driver DVD. Contains also touch screen driver suitable for military displays.	Menu and Driver browser for Microsoft® Windows®

Package may also include:

Item	Description	Illustration
	4 pcs of M6X12 Unbraco bolts (Included with bracket) **These should only be used to secure the bracket on the display.** If you prefer your own bolts, make sure they do not exceed 12mm in length. Use any longer will do serious damage to components inside the product!	
 13750 ES 100	1 pcs of Standard Serial Cable DSUB 9p Male to DSUB 9p Female - Length approx: 1.5m This cable is included in the package if the unit was delivered with a factory mounted touch screen or remote control serial interface installed.	

General

About this manual

The manual contains electrical, mechanical and input/output signal specifications. All specifications in this manual, due to manufacturing, new revisions and approvals, are subject to change without notice. However, the last update and revision of this manual are shown both on the frontpage and also in the “Revision History” chapter at the end of the manual.

Furthermore, for third party datasheet and user manuals, please see dedicated Documentation and Driver DVD delivered with the product or contact our sales/technical/helpdesk personnel for support.

About Hatteland Display

Hatteland Display is the leading technology provider of specialized display and computer products, delivering high quality, unique and customized solutions to the international maritime, naval and industrial markets.

The company represents innovation and quality to the system integrators world wide. Effective quality assurance and investment in sophisticated in-house manufacturing methods and facilities enable us to deliver Type Approved and Mil tested products. Our customer oriented approach, technical knowledge and dedication to R&D, makes us a trusted and preferred supplier of approved solutions, which are backed up by a strong service network.

hatteland-display.com

You will find our website full of useful information to help you make an informed choice as to the right product for your needs. You will find detailed product descriptions and specifications for the entire range on offer be it Series 1, Series 2, Computers & Panel Computers, Military solutions as well as the range of supporting accessories. The site carries a wealth of information regarding our product testing and approvals in addition to company contact information for our various offices around the world, the global service centers and the technical help desk, all ensuring the best possible support wherever you, or your vessel, may be in the world.

Contact Information

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Sales office, San Diego / USA: Hatteland Display Inc. 11440 W. Bernardo Court, Suite 300 San Diego, CA 92127, USA Tel: +1 858 753 1959 Fax: +1 858 430 2461	

For an up-2-date list, please visit www.hatteland-display.com/locations

MIL Qualified / Naval Military - Introduction

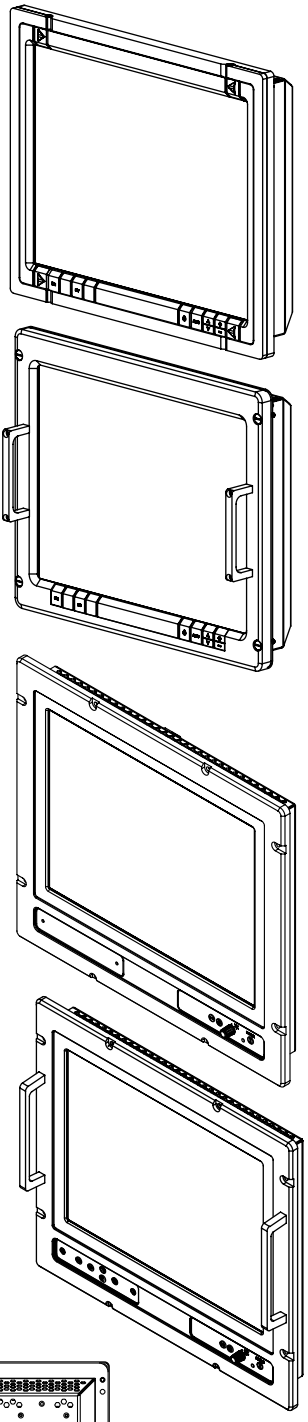
Our knowledge of the unique design, testing and life-cycle management issues of displays for naval vessels has enabled us to develop a high quality range called Naval Line, which can be found in navigation, automation and C4I solutions aboard everything from aircraft carriers and destroyers to patrol boats and submarines.

Taking our de facto industry standard, field proven Series 1 product line as a foundation, we are able to offer fully qualified and certified displays designed purely for use aboard naval vessels. Naval Line displays are designed to standard form and fit, and can be delivered as ECDIS / WECDIS ready.

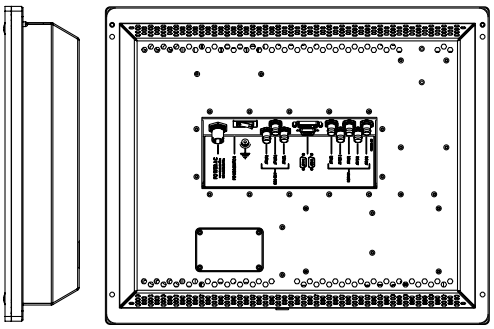
Our proprietary Optical Bonding technology is available across all Naval Line displays. It improves performance and viewing clarity dramatically by eliminating condensation, reducing sunlight reflection by up to 95%, increasing strength during impact and lowering operating temperature to improve reliability and overall lifespan.

The flagship Hatteland Display Naval Multi Display (NMD) and Combat Management Display (CMD) variation are both best-value display solutions for demanding C4I applications. They incorporate a high-contrast UXGA resolution LCD, provide built-in test capabilities, and are a drop-in replacement for existing displays, so they are therefore ideally suited to either the naval new-build or retrofit markets.

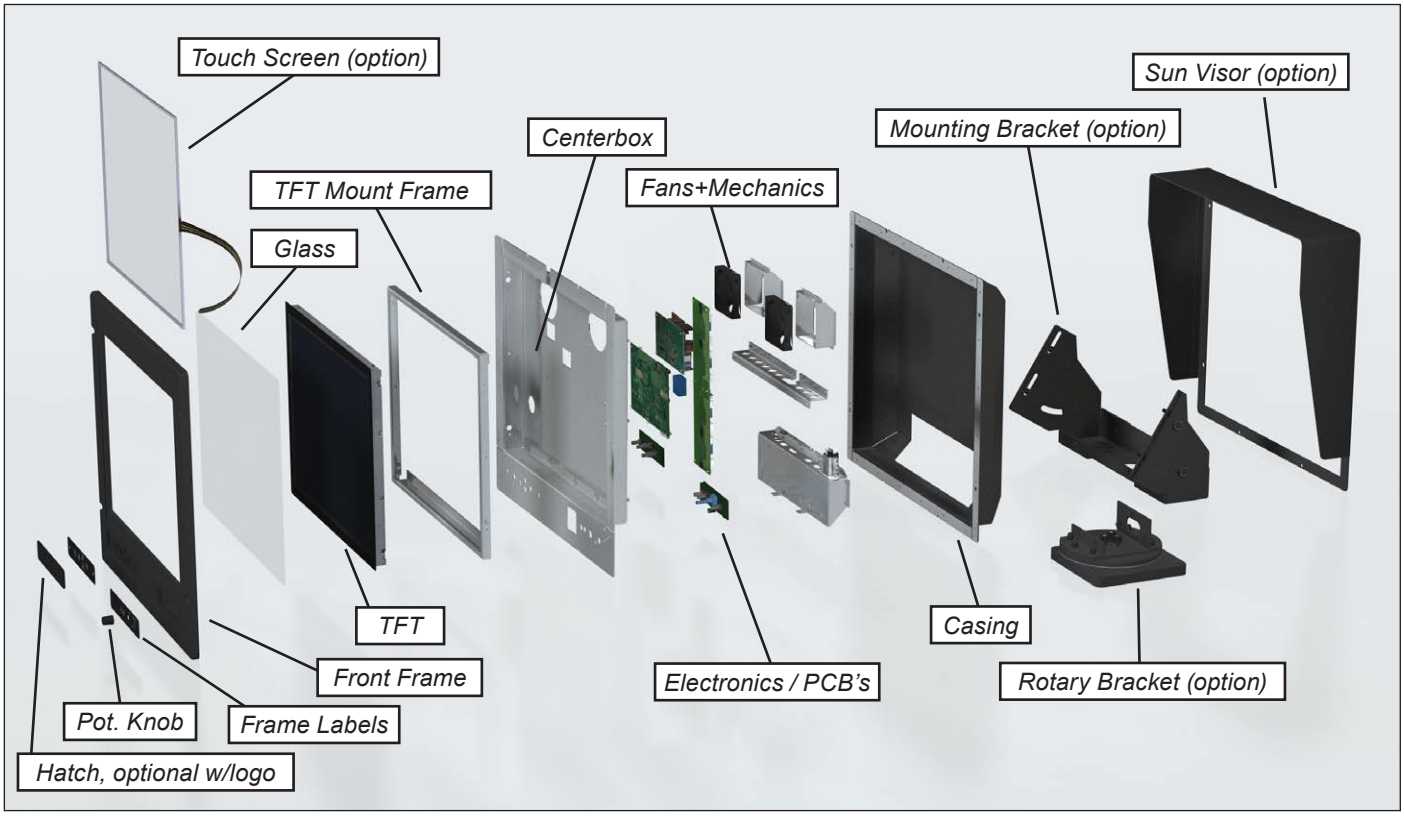
As the Navies of the world move toward COTS-based, open architecture systems, Hatteland Display can be trusted to provide high quality tested and approved displays, developed only for maritime use, without sacrificing performance or value.



- TYPE APPROVED
- ECDIS COMPLIANT
- 901D SHOCK-QUALIFIED
- FORM, FIT AND FUNCTION
- SUPERIOR BONDING TECHNOLOGY
- CERTIFIED FOR C4, NAVIGATION AND AUTOMATION



Basic Construction - Series 1



Example with mounting bracket

Example with sun visor, mounting bracket and rotary bracket

Touch screen products

Capacitive Touch screen

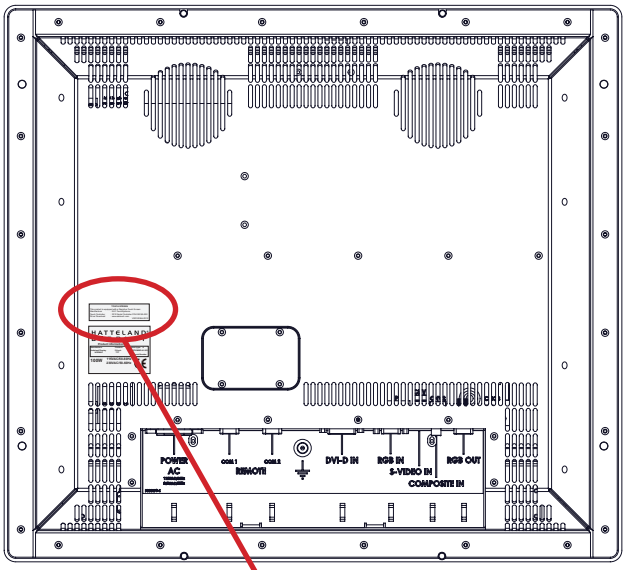
The glass overlay has a coating that stores the charge deposited over its surface electrically. It will not operate with either a gloved hand or with a mechanical stylus. Capacitive touch screens operate by applying a small amount of voltage to each corner of the touch screen. When the screen is touched by a human finger it draws a minute amount of current to the X,Y point of contact. This location is calculated by the touch screen controller and transmitted back to the computer connected to the touch screen controller.

CAPACITIVE - Brief Specifications

Subject	Details
Construction	**Top:** ClearTek protective overcoat protects the sensors and increase durability. **Inside:** Electrode X/Y grid pattern and conductive coating. **Bottom:** Glass and conductive coating. Small amount of voltage is applied to the four corners for measuring X and Y coordinates of the touch point.
Positional Accurancy	Reported touch coordinates are within 1.0% of true position. (Based on viewing area dimensions)
Touch Contact Requirements	3 ms for finger input.
Enduarance Tested	More than 225 million touches in one location without noticable degradation to the surface.
Cleaning	Water, isopropyl, alcohol, and similar non-abrasive cleaners.
Liquid Resistance	Liquids on screen does not impede touchscreen performance.
Light Transmission	Up to 88% at 550 nm; dependant on specific surface finish chosen.

Touch screen Technology & Label markings

Information about the factory mounted touch screen and what driver to use, are indicated on the dedicated label on your actual product. The information and location of the label canvary depending on product, this page only decribes the concept.



TOUCH SCREEN
This product is equipped with a Resistive Touch Screen:
Manufacturer : ELO TouchSystems
Touch Controller : 2210 Serial Controller P/N 055165-000
Driver Download : www.elotouch.com
VSD100564-2210

Example label only

Up-2-date touch screen drivers and documentation:
All products are shipped with a Documentation and Drivers DVD or CD which contains suitable drivers for touch screens.

You can also visit our website www.hatteland-display.com to view the same list (or even recently new added products) for our models with touch screen.

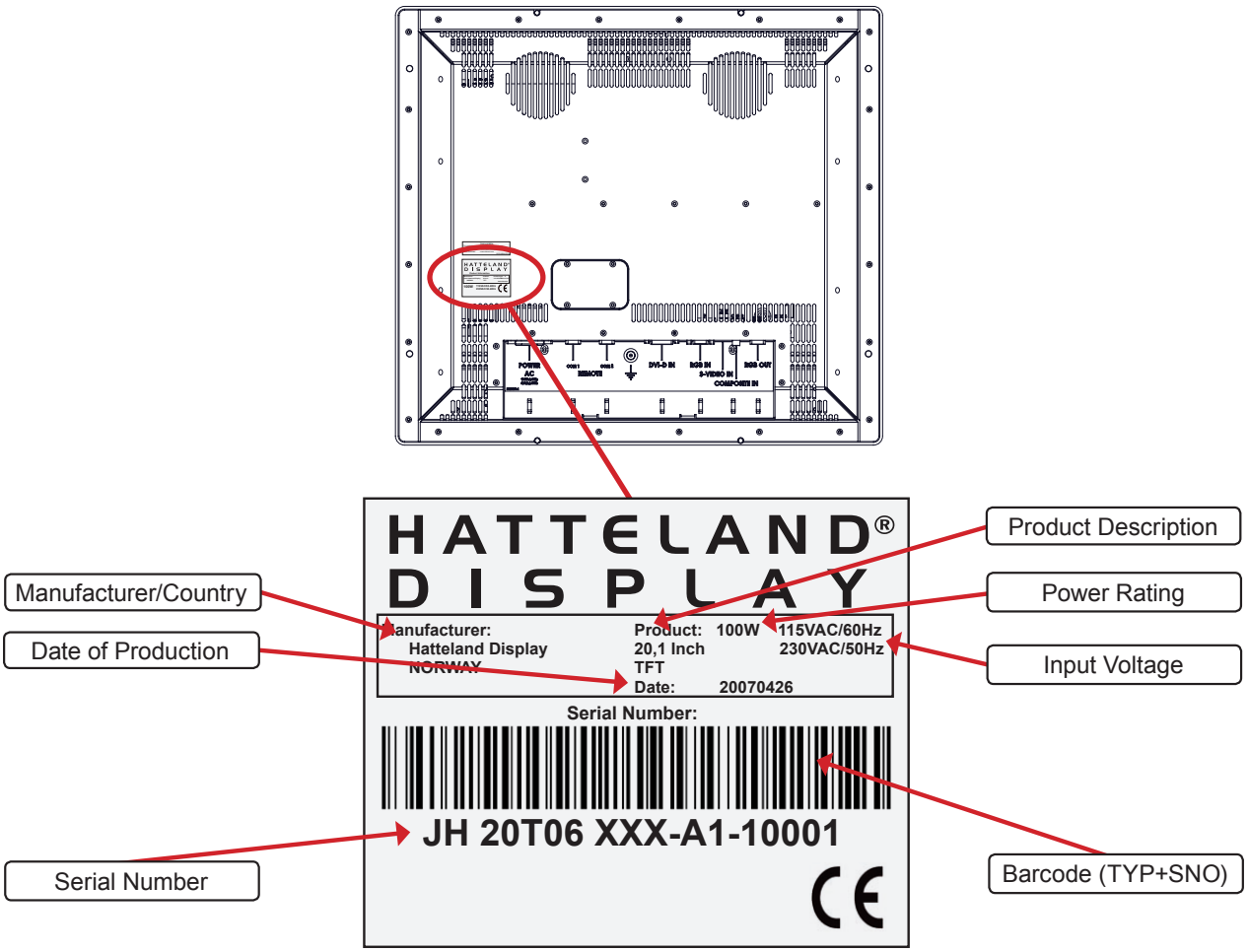
Before using the touch screen, it should be calibrated for your system.

Please install the 3rd party software and use the Calibrate function.

For additional touch controller/screen documentation and updated drivers, please visit the 3rd party manufacturer website as found in the Touch Screen Wizard CD menu.

Product Labeling (examples)

Serial Number Label and Location



Product Type and Serial Number

Please note that S/N now reflects Hardware Code (HWCODE). S/N with 3-digits indicate pre-HW01 model, while S/N with 5-digits indicate HW01 model. For more information regarding HW01, please review own chapter in this manual. This only applies for Maritime Multi Display based products.

```
AA XXAXX AAA-AX-XXXXX   NOMENCLATURE - A=Letters, X=Numbers
JH 20T06 MMD-A1-10001   Example
|| ||||| ||| || |||||
|| ||||| ||| || ¤----   Serial Number, Either xxx or 1xxxx (HWcode indication)
|| ||||| ||| ¤¤------   Hardware Sub Version (AC=x1 / DC=x2 / Cx=Touch / Ex=ECDIS)
|| ||||| ¤¤¤---------   Standard Term ID or customized Term ID. Like MMD or MIL
|| |||¤¤------------    Hardware/PCB Electronics Version ID
|| ||¤---------------   TFT (Thin Film Transistor)
|| ¤¤----------------   Display Size (inch)
¤¤------------------   Manufacturer ID / Product Series ID
```

Warranty Label

If you are to perform service on a unit still under warranty, any warranty will be void if this label show signs of removal attempts (re-gluing) or removed completely. This label is located on the back of the product and covers a key screw. This is to aid service departments to determine if there has been any unauthorized service on a unit still under warranty.

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Installation

General Installation Recommendations

Installation and mounting

1. Most of our products are intended for various methods of installation or mounting (panel mounting, bracket mounting, ceiling/wall mounting etc.); for details, please see the relevant mechanical drawings for panel cutout dimensions and product dimensions. For Panel/console installations, please use screws as specified in the Contents of Package chapter.

2. Adequate ventilation is a necessary prerequisite for the life of the product. The air inlet and outlet openings must definitely be kept clear; coverings which restrict ventilation are not permissible.

3. Do not install the unit in a horizontal position (laying down), as this will cause heat to build up inside the display which will damage the LCD Panel. To prevent this problem we recommend installing the unit in a vertical position (±40 degrees) to improve the airflow through the unit.

4. To further improve the cooling of the unit we recommend installing Cooling Fans underneath blowing upwards into the unit air inlet. This may be required in high temperature applications and also when there is reason to expect temperature problems due to non-optimal way of mounting.

5. Exposure to direct sunlight can cause a considerable increase in the temperature of the unit, and might under certain circumstances lead to overtemperature. This point should already be taken into consideration when the bridge equipment is being planned (sun shades, distance from the windows, ventilation, etc.)

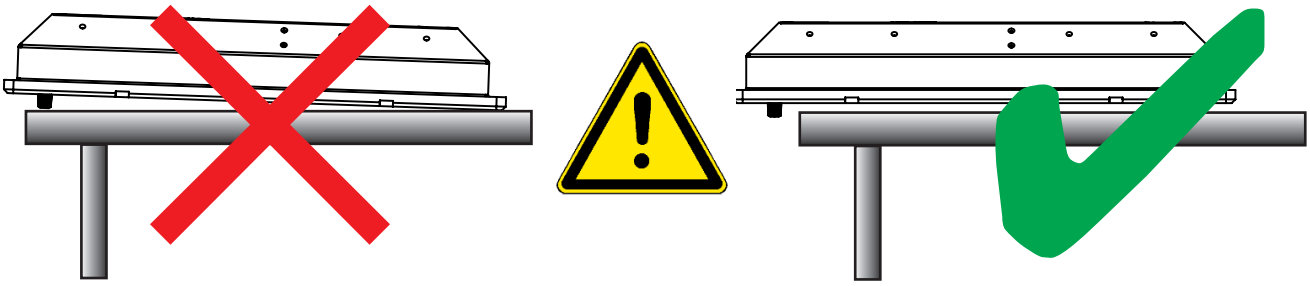
6. Space necessary for ventilation, for cable inlets, for the operating procedures and for maintenance, must be provided.

7. Information about necessary pull-relievers for cables is given in the installation drawings. Attention must be paid to this information so that cable breaks will not occur, e.g. during service work.

8. Do not paint/re-paint the product. The surface treatment influences on the excess heat transfer. Painting, labels or other surface treatments that differ from the factory default might cause overheating

Brightness knob precaution

Please be aware of the risk of breaking or bending the brightness knob. The brightness knob should be free of any obstruction.



General Installation Recommendations

Ergonomics

1. Adjust the unit height so that the top of the screen is at or below eye level. Your eyes should look slightly downwards when viewing the middle of the screen.

2. Adjust screen inclination to remain gaze angle to the centre of the screen approximately perpendicular to the line of gaze.

3. When products are to be operated both from a sitting position and from a standing position, a screen inclination of about 30° to 40° (from a vertical plane) has turned out to be favourable.

4. Depending on solution, the units may be provided with optical bonding technology to reduce reflections and are viewable in direct sun light, but as a general rule the units at the bridge wing area is recommended to be installed or mounted by suitable alignment or bulkhead / deckhead mounting in such a way that reflections of light from the front pane of the display are not directed into the observer's viewing direction.

5. The use of ordinary commercial filter plates or filter films is not permitted for items of equipment that require approval (by optical effects, "aids" of that kind can suppress small radar targets, for example).

General mounting instructions

- The useful life of the components of all Electronics Units generally decreases with increasing ambient temperature; it is therefore advisable to install such units in air-conditioned rooms. If there are no such facilities these rooms must at least be dry, adequately ventilated and kept at a suitable temperature.

- This device is cooled by air flowing across the rear cover and air flowing through the ventilation holes. The cooling must not be impaired by partial covering of the unit or by installation of the unit in a confined cabinet.

- Units which are to be used on the bridge wing must be installed inside the "wing control console" protected against the weather. In order to avoid misting of the viewing screen, a 25 ... 50 W console-heating (power depending on the volume) is recommended.

- When selecting the site of a display unit, the maximum cable lengths have to be considered.

- The impairment of read-out from a display screen by direct light from lamps or the sun must be avoided. Rear windows must be blacked out by means of roller blinds or Venetian blinds.

- Disturbing reflections on the screen of a display caused by pilot lamps and illuminated signs must be prevented by suitable measures (screening or relocating).

- When a product is being installed, the surface base or bulkhead must be checked to ensure that it is flat in order to avoid twisting of the unit when the fixing screws are tightened, because such twisting would impair mechanical functions. Any unevenness should be compensated for by means of spacing-washers.

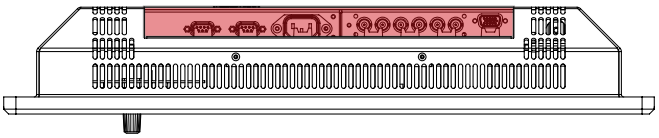
- Transportation damage, even if apparently insignificant at first glance, must immediately be examined and be reported to the freight carrier. The moment of setting-to-work of the equipment is too late, not only for reporting the damage but also for the supply of replacements.

Cables

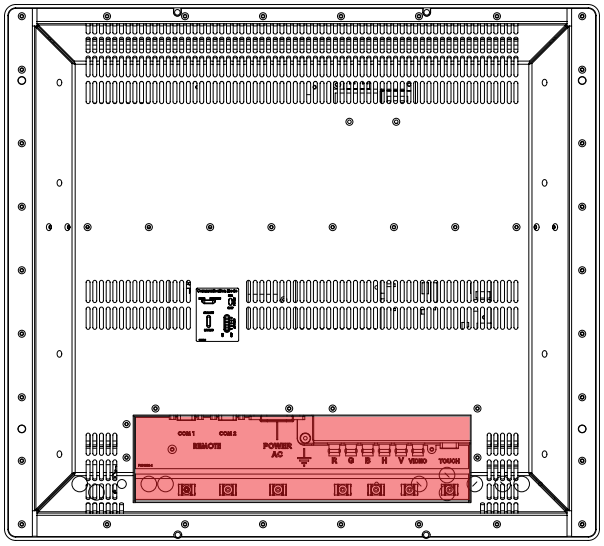
Use only high quality shielded signal cables with separate coax for Red, Green and Blue. (RGB)
If your product have an DVI-D connector, use only high quality DVI cables.

Cable Entries & Connectors (Marked area) - Illustration only

Bottom View



Back View



Maximum Cable Length

The RGB/DVI cable should generally be kept as short as possible to provide a high quality output on the display. The maximum cable length will depend on the signal resolution and frequency, but also on the quality of the signal output from the computer. Recommended is 60Hz vertical
frequency.

Cables up to 10 meters generally provides good picture quality even with a 1600x1200 (UXGA) 60Hz signal. In most cases (especially with lower resolutions) even longer cables will provide a satisfactory result. This should however be tested in advance before making the decision on how far the unit can be placed from the signal source.

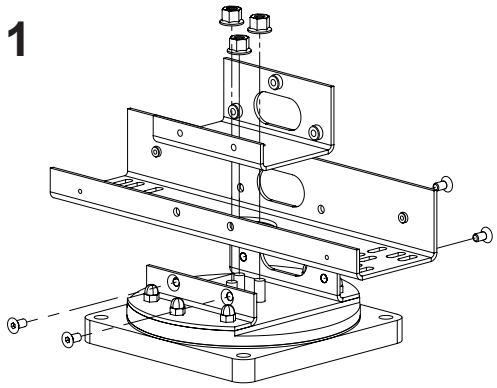
Rotary Bracket / Mounting Bracket Assembly or Disassembly

Use the provided bolts included in the package to assemble the brackets. Follow the steps below. You must provide your own bolts to secure it to a table / desktop. Recommended size is: M10 and minimum 30mm in length.

3 pcs

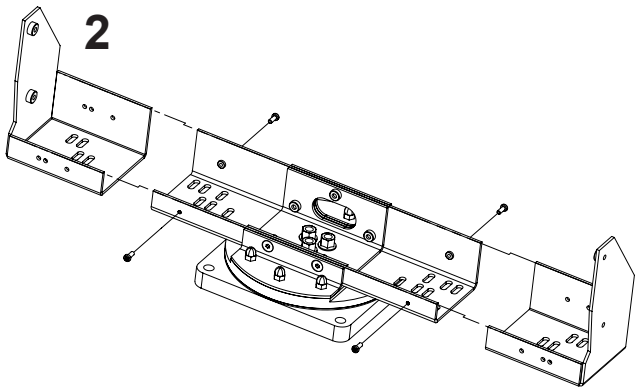
4 pcs

1



4 pcs

2



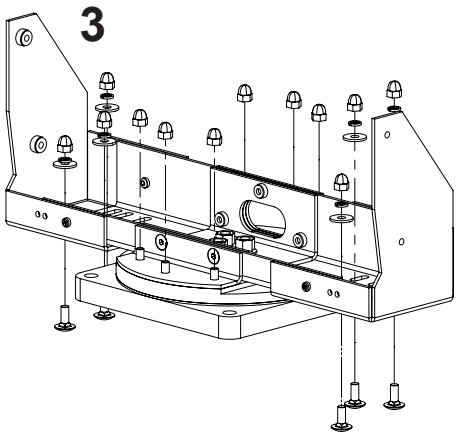
12 pcs

6 pcs

6 pcs

6 pcs

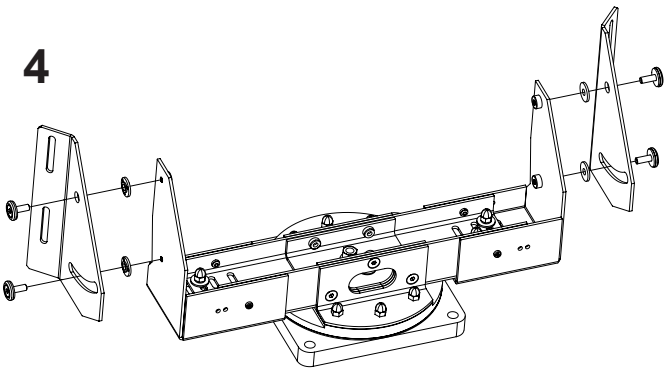
3



4 pcs

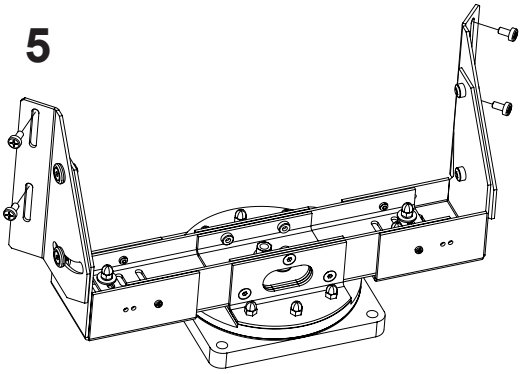
4 pcs

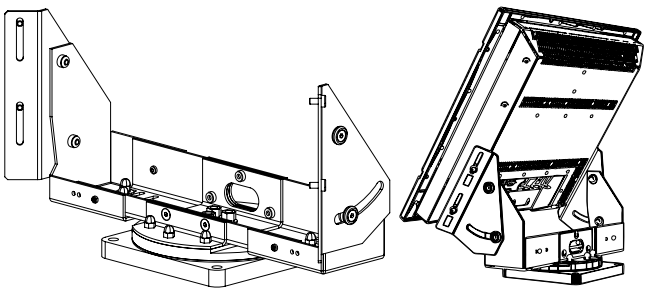
4



4 pcs

5

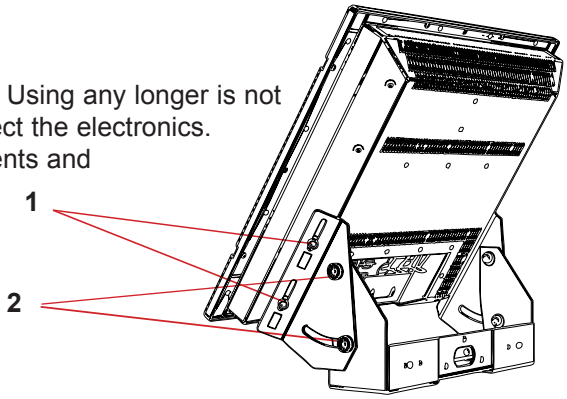




Mounting Bracket

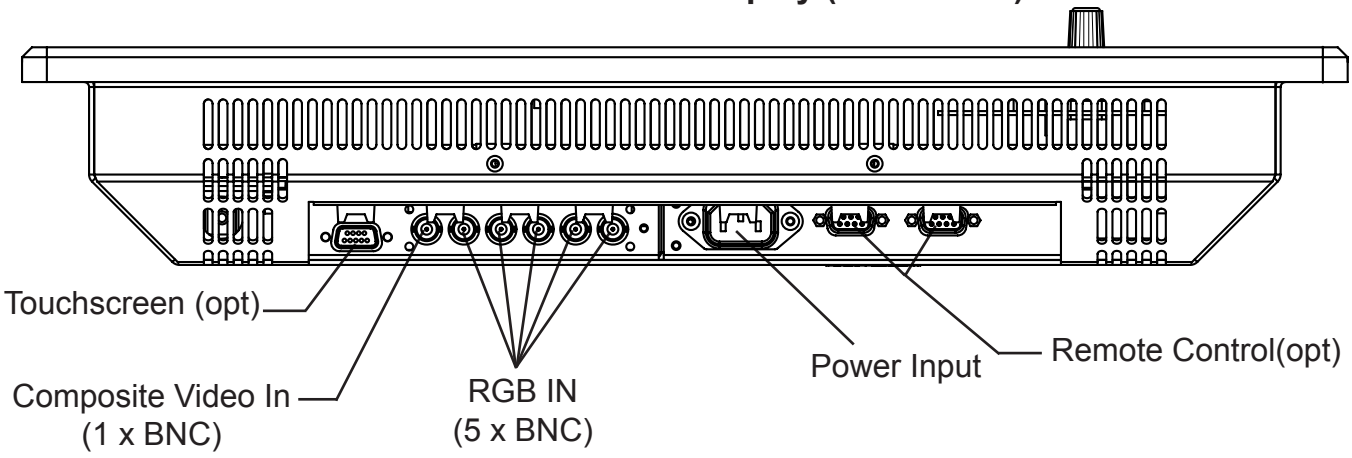
Note that the length of bolts should not exceed 12mm (ref: #1 and 5). Using any longer is not possible due to mechanical design inside which are designed to protect the electronics. Review also technical drawings chapter in the manual for measurements and dimensions of brackets.

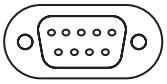
1: Mount bolts on each side.
Make adjustments before securing the bolts.
2: Adjust the tilting angle and secure the bolts.



Physical Connections - JH MIL Models

Connection area of display (illustration)



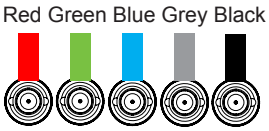


TOUCHSCREEN: (optional)

Connect the RS-232 cable to the D-SUB 9P Connector (female) on the rear side of the TFT display. Connect the other end to your COM port of your computer. Install the nesscessary software needed to operate it.
- Note that the connector is only installed upon customer request.

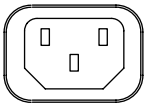
COMPOSITE VIDEO IN (PAL/NTSC/SECAM VIDEO):

Connect your composite video signal cable into the BNC plug. To activate the Picture In Picture function, the TFT display must be configured via the OSD menus.
- Note that *Composite Video* must be selected as the incoming video source.



RGB IN: (RGBHV)

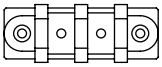
Connect your BNC cable to the 5 x BNC Connectors (female) connect the opposite to your equipment. Make sure the connectors is firmly fasten and that you do not switch around the separate signal/colors for: R(to red color cable), G(to green color cable), B(to blue color cable) H(to horizonal sync gray color cable) and V(to vertical sync black color cable).



POWER INPUT: (AC Version)

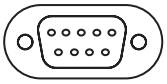
The internal AC power module supports both 115VAC/60Hz and 230/50Hz power input. You may secure the cable further by mounting it to the base mounted cable tie clamp.

Physical Connections - JH MIL Models



POWER INPUT: (DC Version, only available for certain models)

Secure the cables (check polarity!) to the screw terminal, you may secure the cable further by mounting it to the base mounted cable tie clamp. The internal DC power module supports voltage from 12 to 24 VDC depending on the product model. Please check specifications for your exact product/type number elsewhere in this manual!



REMOTE CONTROL:

The two serial remote control connectors are used for displays with the JHSCOM-A1 or JHSCOM-B1. It features a RS232/RS422/RS485 interface for controlling all parameters, including brightness, for the display. For further information on usage, see the “Control Interface” section in this manual.

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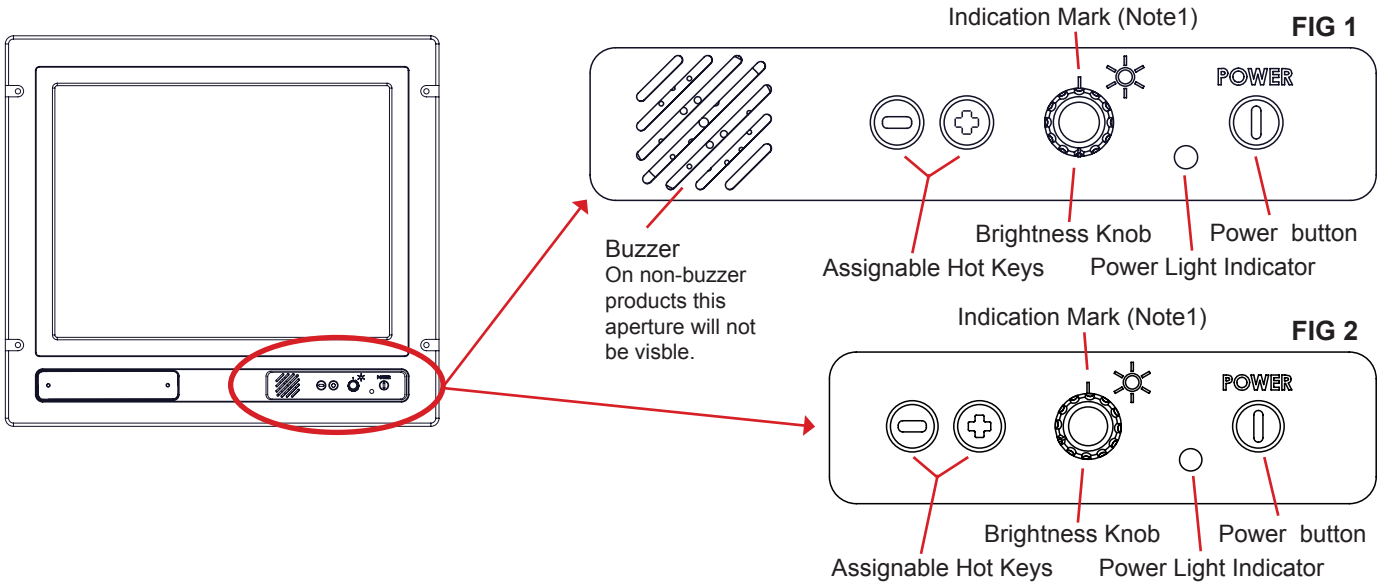
Operation

User Controls

START-UP:

The unit features a Instant-ON / Delay-OFF functionality, which ensures that it is not turned off by user accident. The location is on the right bottom side of the unit together with the other user controls as illustrated in the labels below. There exists several types / sizes of labels which reflects some of our standard functionalities like buzzer. **FIG 1** label is used on products designed after Q4 2005. **FIG 2** label is used on products designed before Q4 2005.



Power ON: To turn the unit on, press down the power button. The power light indicator (LED) will illuminate green.
(If no signal is detected, the screen will be black and the power light indicator (LED) will illuminate red).
Power OFF: To turn the unit off, press and hold the power button down for 3 seconds. The power light indicator will be off/black.

BRIGHTNESS ADJUSTMENT CONTROLS:

The unit features a 100% dimmable image, which means it is capable of displaying a completely black image when the BRIGHTNESS knob is turned fully to the left.

NOTE1: For ECDIS systems the brightness knob indication mark should be aligned directly with the indication mark located on the label. (See illustration FIG1 / FIG2)
NOTE1: The design and placement of the user / osd controls may vary slightly from product to product due to product evolution, however the overall usage is unchanged.

AUTOMATIC POWER LIGHT DIMMING:

The unit features a Power LED Dimmer function which control the light intensity of the power light indicator. There are two different solutions for this feature.

1- Intelligent Auto Power LED Dimmer which control the light intensity based on your environment lightning. This can also be manually adjusted using the Led Adjust knob on the rear side of the display.
2- The light intensity is regulated according to the backlight, that is according to the brightness knob. With the exception that when the backlight brightness is zero, the power led is just visible in dark environment. This means that the power led is not visible in daylight when the brightness knob is turned fully to the left.

Note: If there is a led adjustment knob at the connection area of the display as described in **"INSTALLATION AND RECOMMENDATIONS"** chapter, the manner of operation described in paragraph one applies. For displays produced after the creation date of this manual, paragraph two applies. For displays produced before year 2002, paragraph one applies.

ASSIGNABLE HOT KEYS:

The user can assign various display functions as hot keys (increase/decrease). This will enable the user to quickly adjust the brightness, image size, contrast or other functions to control the image. To assign these hot keys, enter the **"UTILITIES MENU/ DIRECT ACCESS"** menu and change them to the desired hot key function. Default is to increase/decrease brightness.

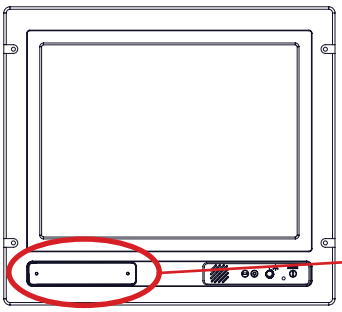
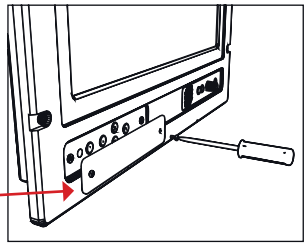
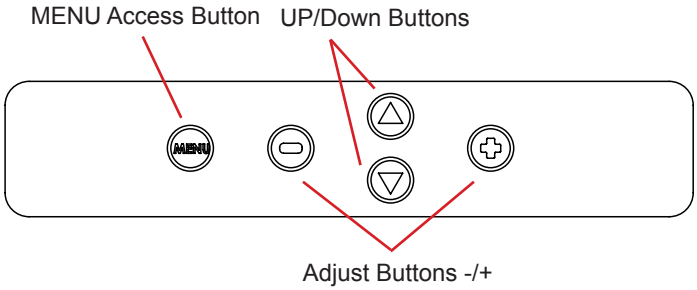


FIG 1





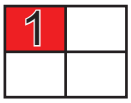
USER CONTROLS:

The On Screen Display (OSD menu) controls are located under the metal hatch on the left side of the unit. To loosen it, use a suitable screwdriver and dismount the two screws as illustrated in **FIG 1**. To begin understanding the workflow of the menu, follow these steps for a quick start.

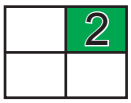
1: Press the “MENU” button. The OSD menu will show all the available functions you can adjust or control.
2: You can move to the next icon by pressing “MENU”.
3: Select options within icon menu by pressing “UP” or “DOWN” buttons. The selected option will turn yellow.
4: Use “+” or “-” buttons to increase/decrease values.
5: Move the selection left or right by using “+” or “-” buttons. The selected option will turn green.
6: To confirm the selection, press “+” button. To abort press “-” button.

OSD MENU:

The On Screen Display (OSD menu) contains several functions that will let the user to adjust or setup the display to their preferred setting. The functions are shown as easy understandable icons. Some of the menus have sub-menus, use “+” to access and “MENU” to go back to the previous menu. The OSD menu consists of 4 modes: (Icon beside function indicates if it’s available in that mode)

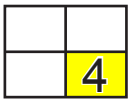


Mode 1 - Available functions in **RGB / DVI* MODE Simplified OSD Menu - (company logo will appear)**
User can adjust the most common functions needed to operate the display.
**Some functions are not available in DVI mode.*



Mode 2 - Available functions in **RGB / DVI* MODE Advanced OSD Menu - (no company logo will appear)**
User can access more advanced functions. (Service menu).
**Some functions are not available in DVI mode.*

Mode 3 - Available functions in **VIDEO MODE Simplified OSD Menu - (company logo will appear)**
User can adjust the most common functions needed to operate the display.



Mode 4 - Available functions in **VIDEO MODE Advanced OSD Menu - (no company logo will appear)**
User can access more advanced functions. (Service menu).

*RGB/DVI MODE = When RGB/DVI signal (i.e OS or radar / charts) are displayed full screen.
*VIDEO MODE = When video signal (i.e CAMERA / VCR / DVD) are displayed full screen.

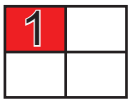
To access the “Advanced/Full” OSD Menu, you must press and hold the “DOWN” button while turning power on. When picture appears, release the “DOWN” button and press “MENU” to access the “Advanced/Full” functions. If you have the “Memorized state” version of the OSD menu, use the same procedure to switch between “Simplified/Normal” & “Advanced/Full” modes (also known as NORMAL/TOGGLE).

For more information about “Memorized state” and the different OSD menu modes, see the “NOTES” section in this manual.

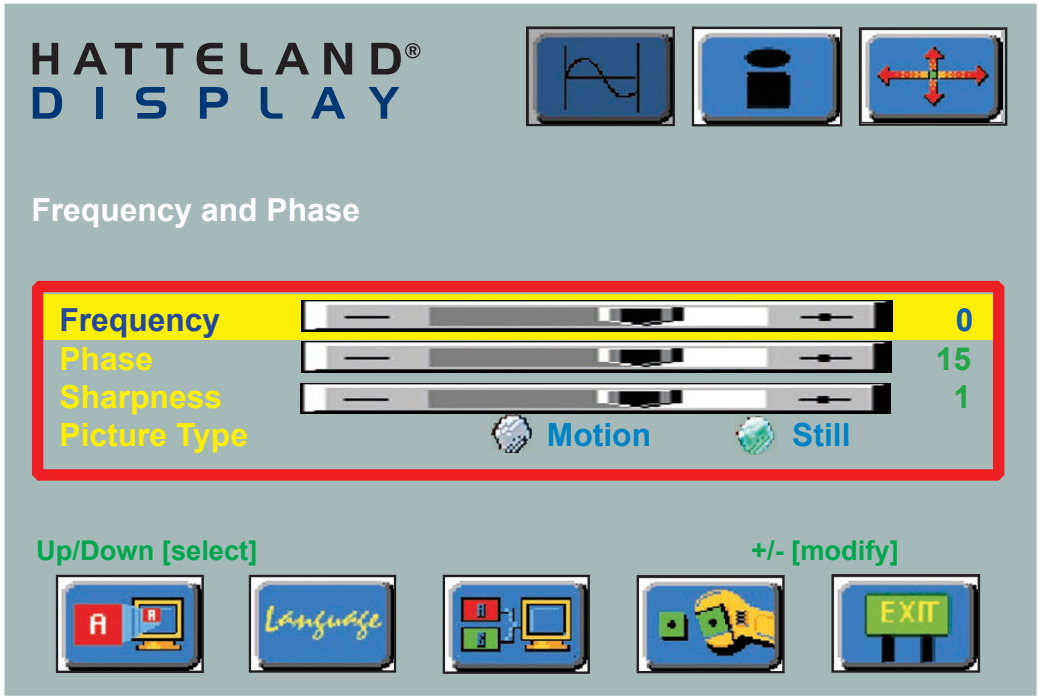
WARNING !! ONLY A QUALIFIED SERVICE ENGINEER SHOULD ACCESS THE ADVANCED/SERVICE MENU. PERFORMANCE OF THE DISPLAY MAY BE SERIOUSLY AFFECTED!

OSD Menu Overview

Mode 1 - Function layout in **RGB / DVI MODE Simplified/Normal OSD Menu: (User menu)**

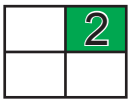


Note that to be in RGB / DVI MODE, a computer signal must be present in full screen, i.e Windows or other operating system/radar system. Having a PIP view simultaneously will not interfere or change the menu structure in any way.

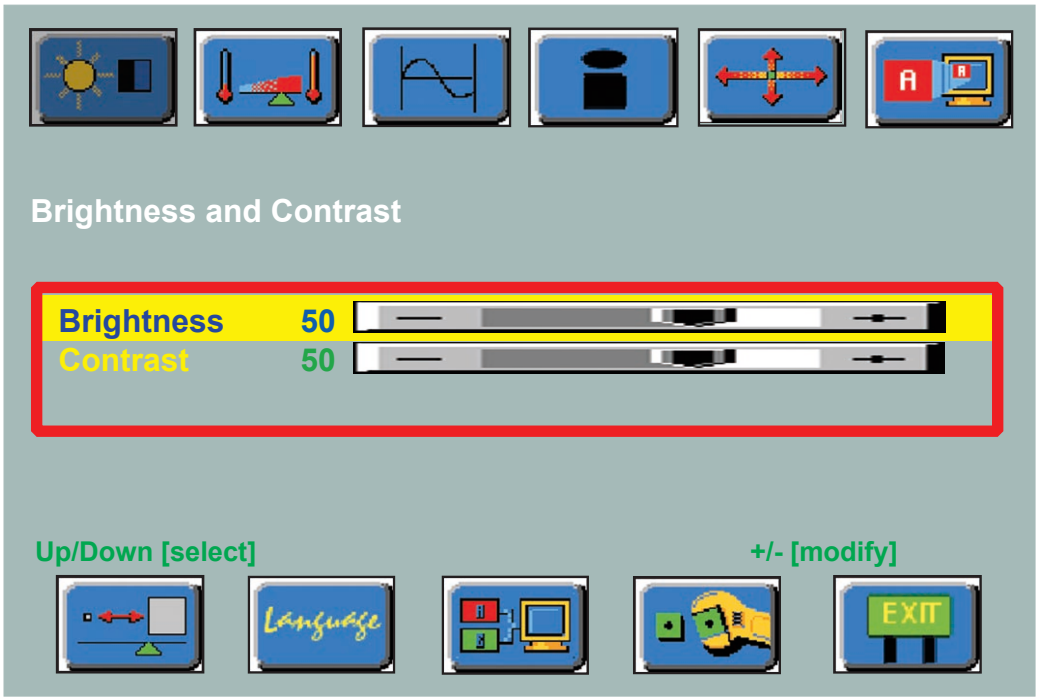


Please note: Illustration only! Icons/text may deviate from actual OSD menu on your product due to different OSD software revisions.

Mode 2 - Function layout in **RGB / DVI MODE Advanced/Full OSD Menu: (Service menu)**

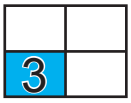


Note that to be in RGB / DVI MODE, a computer signal must be present in full screen, i.e Windows or other operating system/radar system. Having a PIP view simultaneously will not interfere or change the menu structure in any way.

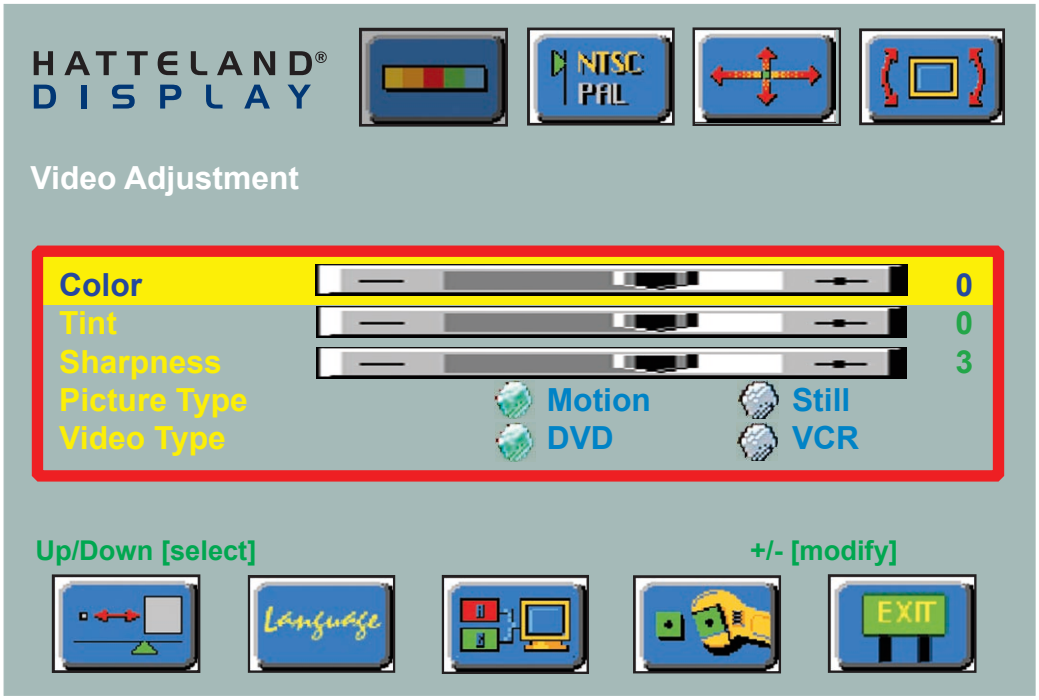


Please note: Illustration only! Icons/text may deviate from actual OSD menu on your product due to different OSD software revisions.

Mode 3 - Function layout in **VIDEO MODE Simplified/Normal OSD Menu: (User menu)**

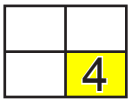


Note that to be in VIDEO MODE, a video signal must be present in full screen, i.e from a camera, VCR or DVD player.

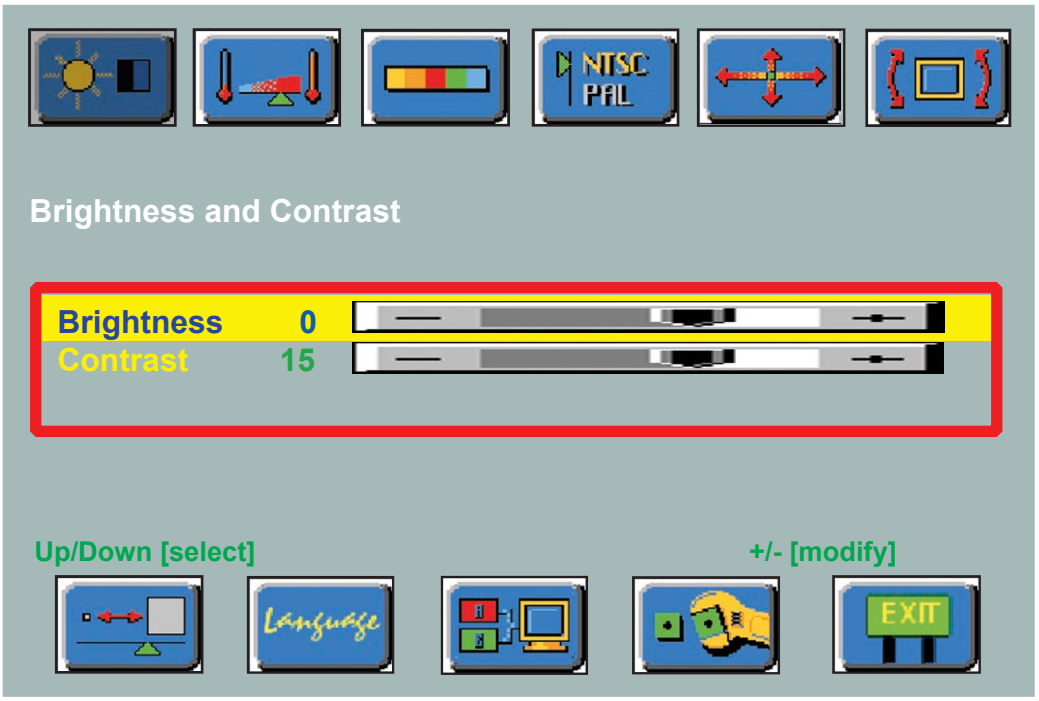


Please note: Illustration only! Icons/text may deviate from actual OSD menu on your product due to different OSD software revisions.

Mode 4 - Function layout in **VIDEO MODE Advanced/Full OSD Menu: (Service menu)**



Note that to be in VIDEO MODE, a video signal must be present in full screen, i.e from a camera, VCR or DVD player.



Please note: Illustration only! Icons/text may deviate from actual OSD menu on your product due to different OSD software revisions.

OSD Menu Functions

BRIGHTNESS AND CONTRAST: (No function in DVI mode)
Selecting this function will enable the user to adjust brightness and contrast for the display.

(No Function in DVI)	BRIGHTNESS:		Increase/decrease brightness level, total: 100 steps
(No Function in DVI)	CONTRAST:		Increase/decrease contrast level, total: 100 steps

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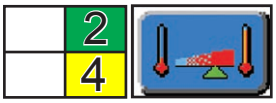
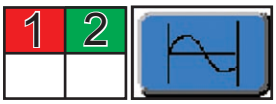


COLOR TEMPERATURE:
Selecting this function will enable the user to modify the warmness of the picture. Higher temperature = "cooler" picture. Lower temperature = "warmer" picture.

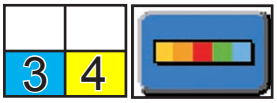
User can select between *9500K, 8000K, 6500K,* and *5000K* color temperature measured in Kelvin degrees. Press "+" to access the sub-menu, where the RGB values can be adjusted. Use "+" and "-" buttons to adjust these values, and "MENU" to exit. (Saving is done automatically)



FREQUENCY AND PHASE: (Some functions not available in DVI mode)
Selecting this function will enable the user to modify the image horizontal size and fine tune the image quality.

(No Function in DVI)	FREQUENCY:		Increase/decrease the image horizontal size.
(No Function in DVI)	PHASE:		Fine tune the data sampling position (adjust image quality.)
(No Function in DVI)	SHARPNESS:		Increase/decrease video image sharpness level.

PICTURE TYPE : Motion / Still (Adjustment for best image quality)
If graphics on screen move a lot, select "Motion"
If graphics on screen are mostly still, select "Still"



VIDEO ADJUSTMENT:
Selecting this function will enable the user to modify the color saturation of the picture, tint and sharpness.

COLOR:		Increase/decrease video color level.
TINT:		Increase/decrease tint level.
SHARPNESS:		Increase/decrease video image sharpness level.

PICTURE TYPE : Motion / Still / Normal (Adjustment for best image quality)
If graphics on screen move a lot, select "Motion"
If graphics on screen are mostly still, select "Still"
General motion - non flicker mode, select "Normal"

VIDEO TYPE : Change to best match the source signal. (DVD / VCR)

VIDEO SYSTEM:
Selecting this function will enable the user to select video system and input signals.

AUTO	: Automatic detection of NTSC or PAL system. (Not applicable in SECAM)
NTSC / NTSC 4.43	: Manual select NTSC system.
PAL / PAL M	: Manual select PAL system.
SECAM	: Manual select SECAM system.

OSD Menu Functions

STATUS:
Selecting this function will display graphic information such as resolution and frequency.

POSITION: (No function in DVI mode)
Selecting this function will enable the user to position the image within the display area.

(No Function in DVI) IMAGE UP/DOWN : Position the image vertically using “UP” or “DOWN” buttons.
(No Function in DVI) IMAGE LEFT/RIGHT : Position the image horizontally using “+” or “-” buttons.

PICTURE IN PICTURE:
Selecting this function will enable the user to configure PIP window size, input signal source, horizontal and vertical position and more.

PIP SIZE : Select PIP window size. Adjustable in steps 0 (off) to 24.
PIP SOURCE : Select video source to be displayed in PIP window.

Available sources are:

AUTO = automatic detection of Composite or S-Video.
COMPOSITE = manual select composite video signal only.
SVIDEO = manual select S-Video signal only.

HORIZONTAL POSITION: Adjust the position of the PIP window horizontally.
VERTICAL POSITION: Adjust the position of the PIP window vertically.

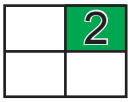
ADVANCED SETTINGS: (Click to enter sub-menu) **- NOTE: Tint adjust not available for S-Video signals.**

BRIGHTNESS: Increase/decrease the image brightness of the PIP window.
CONTRAST: Increase/decrease the image contrast of the PIP window.
SHARPNESS: Increase/decrease the image sharpness of the PIP window.
TINT: Increase/decrease the tint of the image of the PIP window.
COLOR: Increase/decrease the color of the image of the PIP window.

ROTATION:
Selecting this function will enable the user to rotate the image to either landscape (NORMAL) or portrait (ROTATED) format.

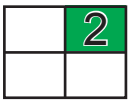
OSD Menu Functions

GRAPHIC SCALING MODES:
Selecting this function will enable the user to configure the graphic scaling of the RGB/DVI or VIDEO image. The change will happen realtime.
Note: Some of these functions will impact on image quality, and will therefore not show the optimal 1:1 picture with correct aspect ratio and resolution suitable for the TFT module.



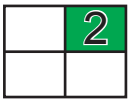
Scaling methods in PC/DVI MODE: ONE TO ONE, FILL SCREEN, FILL TO ASPECT RATIO, NONLINEAR SCALING MODES

Scaling methods in VIDEO MODE: NORMAL, LETTERBOX, LETTERBOX WITH SUBTITLES, NONLINEAR SCALING MODES

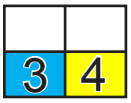


ONE TO ONE: (Press "+" to access the sub-menu)

HORIZONTAL PAN: Increase/decrease the horizontal pan.
VERTICAL PAN: Increase/decrease the vertical pan.



FILL SCREEN : Enable full screen expansion for lower resolution image.
FILL TO ASPECT RATIO : Enable full screen expansion for lower resolution image according to aspect ratio.

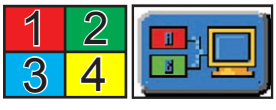


LETTERBOX : Stretches a letterboxed picture to full screen.
LETTERBOX WITH SUBTITLES : Stretches and pans a letterboxed picture to full screen, which enables viewing of subtitles in bottom.

NONLINEAR SCALING MODES: (Press "+" to access the sub-menu)
Will either clip the image off (to black), or stretch/scale the image . This will impact on image quality, and will therefore not show the optimal 1:1 picture with correct aspect ratio and resolution suitable for the TFT module.

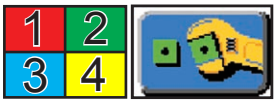
HORIZONTAL CLIPPING: Increase/decrease the horizontal clipping.
HORIZONTAL OFFSET: Increase/decrease the horizontal offset.
HORIZONTAL STRETCH: Increase/decrease the horizontal stretch.
VERTICAL CLIPPING: Increase/decrease the vertical clipping.
VERTICAL OFFSET: Increase/decrease the vertical offset.
VERTICAL STRETCH: Increase/decrease the vertical stretch.

LANGUAGE:
Available languages are: English, Norwegian, Chinese and French. This will affect all text and messages in the OSD menus.

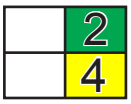


VIDEO SOURCE:
Selecting this function will enable the user to select the type of input signal to show fullscreen. Available inputs are: Analog RGB1, Analog RGB2, DVI, Composite Video, and S-Video. The display unit will switch signal source instantly, so if no signal source is present (physically connected) the image will be black for 1-2 seconds before it resets back to the previous detected signal.
Note: This function will only behave as described if the Utilities/Auto Source Select is set to "High". Factory default is "Off"

OSD Menu Functions



UTILITIES:
Selecting this function will enable the user to configure the OSD menu, define hot keys, verify BIOS Firmware version and miscellaneous operations.



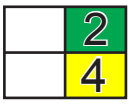
USER SETTING: (Press "+" to access the sub-menu)

DPMS	: Disable / Enable the DPMS function.
DISPLAY INPUT	: Disable / Enable input source name upon power up.
AUTO SOURCE SELECT	: Off = Disable auto source select function. (Default setting) Low = Auto source select enabled ONLY in power up. High = Auto source select ALWAYS enabled.
FILTER	: Auto/On/Off - Signal Noise Reduction for Analog RGB1 Signal. *(Only available/functioning on custom models where required)*
GAMMA	: 1.0 / 1.6 / 2.2 - Adjusts gamma on TFT display.
SERIAL ADRESS	: Set Serial Remote Channel from 0 to 15. *(Consult "Serial Communication (SCOM) Interface" chapter in this manual or the online "Serial Control Interface - MMD / MMC" manual for complete instructions.)*

OSD SETTING: (Press "+" to access the sub-menu)

OSD HORZ POSITION: Position the OSD menu horizontally.
OSD VERT POSITION: Position the OSD menu vertically.

OSD BACKGROUND	: Choose between Translucent or Opaque.
OSD ROTATE	: Choose between Normal / Rotate. Will position the menu either horizontally or vertically.
OSD MODE	; Only available in Advanced/Full menu! "NORMAL" = ALWAYS shows the Simplified version of the OSD menu. Logo will be shown in the top left corner. "TOGGLE" = ALWAYS show the Advanced/Full version of the OSD menu. Logo will NOT be shown in the top left corner. *(Please refer to the beginning of this chapter for information)*
USER TIME OUT	: Adjust the OSD menu time out period in a step of 5 seconds.



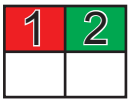
ZOOM: (Press "+" to access the sub-menu)

ZOOM LEVEL: Zooms in the display area from center.
HORIZONTAL PAN: Pan the display area horizontally.
VERTICAL PAN: Pan the display area vertically.

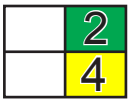
DIRECT ACCESS 1 & 2: (Press "+" to access the sub-menu)
Define the hot key function ("+" or "-" front/under hatch buttons) to one of these OSD functions:
Brightness / Contrast / Zoom / Video Source / PIP* / No Function / Test Pattern
** By pressing the assigned hot key, the sequence of the selected input video source are:*
Analog RGB1 / Analog RGB2 / DVI / Composite Video / S-Video.

NOTE: *When assigning video source to hot key function, please set the "AUTO SOURCE SELECT" to HIGH (see above).*
NOTE: *Direct Access 1 default factory setting is NO FUNCTION*
NOTE: *Direct Access 2 default factory setting is NO FUNCTION*

OSD Menu Functions



CALIBRATE RGB GAIN : Color Calibration. Press “+” to automatically adjust it.



DISPLAY ORIENTATION: (Press “+” to access the sub-menu)
Will flip/inverse the display area including PIP view. Press “+” to choose between:
Normal / Horizontal Inverse / Vertical Inverse / Inverse

LOAD (FACTORY) DEFAULTS: (Press “+” to access the sub-menu).

LOAD USER DEFAULT	: Load your own personal custom settings.
SAVE USER DEFAULT	: Save your own personal custom settings.
LOAD FACTORY DEFAULT	: Will reset the graphic controller settings to the factory preset. Use caution when using this function, as this will override your current settings.
SETUP DDC	: Reset/optimize image information. This function will setup correct DDC (Display Data Channel) information. It allows the display module to send its specifications to the display controller. This information is used by the OSD menu.

TEST PATTERN : Shows a generic test pattern.

EXIT MENU:
Selecting this function will exit the OSD menu.
Press “+” to exit and save the current settings.

Note:
The OSD settings will also automatically be stored in memory when the OSD exit on user timeout.

Specifications

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Specifications - JH 20T03 MIL

Note: All specifications are subject to change without prior notice!

TECHNICAL DESCRIPTION:

TFT Technology:
- 20.1" viewable image size
- Active Matrix, Thin Film Transistor (TFT)

TFT Characteristics:
- Pixel Number : 1280 x 1024
- Pixel Pitch (RGB) : 0.312 (H) x 0.312 (V) mm
- Response Time : 25 ms (typical), "black" to "white"
- Contrast Ratio : 300:1 (typical)
- Light Intensity : 250 cd/m2 (typical)
- Viewable Angle : +/- 85 deg. (typical) (Up/Down/Left/Right)
- Active Display Area : 399.36 (H) x 319.49 (V) mm
- Max Colors : 16.7 millions (depending on graphics card)

Synchronisation:
- Digital separate synchronisation
- Composite synchronisation
- Synchronisation on green
- Auto detects VGA -> SXGA, interlaced and non interlaced
- Video Signal : Analog RGB 0,7Vp-p
  : Input Impedance 75 Ohm
- Horizontal : 31,5 kHz to 91,1 kHz
- Vertical : 60 Hz * to 85 Hz

Resolutions:
- VGA : 640 x 480 (including 640 x 350)
- SVGA : 800 x 600 (including 720 x 400)
- XGA : 1024 x 768
- SXGA : 1280 x 1024 *

** Recommended for optimum picture quality*

Power Supply Options / Consumption:
- 115 & 230VAC - 50 / 60Hz : Model JH 20T03 MIL-A1 / -F1
- Operating : 100 W (max)

EXTENDED TESTING (In addition to IEC 60945):

TEST	LEVEL	SPECIFICATION
Dry heat storage	70°	IEC 60068-2-2 (1974), Test Bd
Cold storage	-40°	IEC 60068-2-1 (1990), Test Ad
Resonance search	4-33 Hz @ 2g No resonance above 2	IEC 60068-2-6 (1995), Test Fc
Endurance Vibration	4-33 Hz @ +/-5mm, 2g	IEC 60068-2-6 (1995), Test Fc
Shock	50g / 11ms	IEC 60068-2-27 (1987), Test Ea
Transient Shock	2-280 Hz Designed to envelope sine shock pulse of 50g / 35ms	IEC 60068-2-57 (1999-11), Test Ff
Rain (drip proof)	280 l/m2/hour 15min pr. orientation	MIL-STD-810F *
Salt Fog	-	MIL-STD-810F *

** Console mounted.*

Typical Type Numbers:

- JH 20T03 MIL-A1 = AC Power
- JH 20T03 MIL-F1 = AC Power, Capacitive Touch Screen

MECHANICAL DESCRIPTION:

Physical Dimensions:
- 534 (W) x 485 (H) x 94 (D) mm
- 21.02" (W) x 19.09" (H) x 3.70" (D)
- Weight: 14 kg (approx)

Input Signal Terminal:
- RGB (PC) signal : 5 x BNC Connectors (RGBHV)
- AC Power signal : Std IEC Inlet (female)

Accessories:
- Touchscreen : 1 x D-SUB 9P Connector (female)
- Remote Control : 2 x D-SUB 9P Connectors (female)

User Controls / On front bezel:
- Power On/Off (push button), Brightness Control, 2 x hotkeys, Mode Status LED

User Controls / Behind hatch:
- On Screen Display control (OSD/OSM)

Environmental Considerations:
- Operating : Temperature -15 deg. C to +55 deg. C
  Humidity up to 95%
- Storage : Temperature -40 deg. C to +70 deg. C
  Humidity up to 95%

EMI TESTING:

The unit has been tested according to the following:

MIL-STD 461E, 1999

- CE 101 - Conducted emission, 30 Hz - 10 kHz
- CE 102 - Conducted emissions, power leads, 10 kHz - 10 Mhz
- CS 101 - Conducted susceptibility, 30 Hz - 50 kHz
- CS 114 - Conducted susceptibility, 10 kHz - 200 MHz
- CS 116 - Conducted susceptibility, damped oscillatory waves
- RE 101 - Radiated emission, magnetic field, 30 Hz - 100 kHz
- RE 102 - Radiated emissions, electric field, 10 kHz - 18 GHz
- RS 101 - Radiated susceptibility, H-field, 30 Hz - 100 kHz
- RS 103 - Radiated susceptibility, electric field, 2 MHz - 18 GHz

Other:

- Transient immunity, 100 ns risetime, 10 µs duration, 325 V_{PEAK}
- Supply voltage variation test, 98 -> 138 VAC, 56.4 -> 63.6 Hz
- Measurements of power consumption = 76W
- Measurements of inrush current = 4 A_{PEAK}

Available Accessories:

Review user manual or separate datasheet for details and measurements.
- JH MMDBR STD-A1 = Bracket
- JH MMDRO STD-A1 = Rotary
- JH 20TSV STD-B1 = Sun Visor
- JH VESA 20T06-A1 = Vesa Bracket
- JH 20TWC STD-B1 = Water Cover
- JH XPR-A1 = External Power Relay

Factory Mounted Options:

- Capacitive Touch Screen
- Color Calibrated models (ECDIS)
- Video Buffer (JH VBUF-A1)

TESTING/APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

EN60945 3rd (IEC945 3rd)
BV - Bureau Veritas
MIL-STD 461E, 1999

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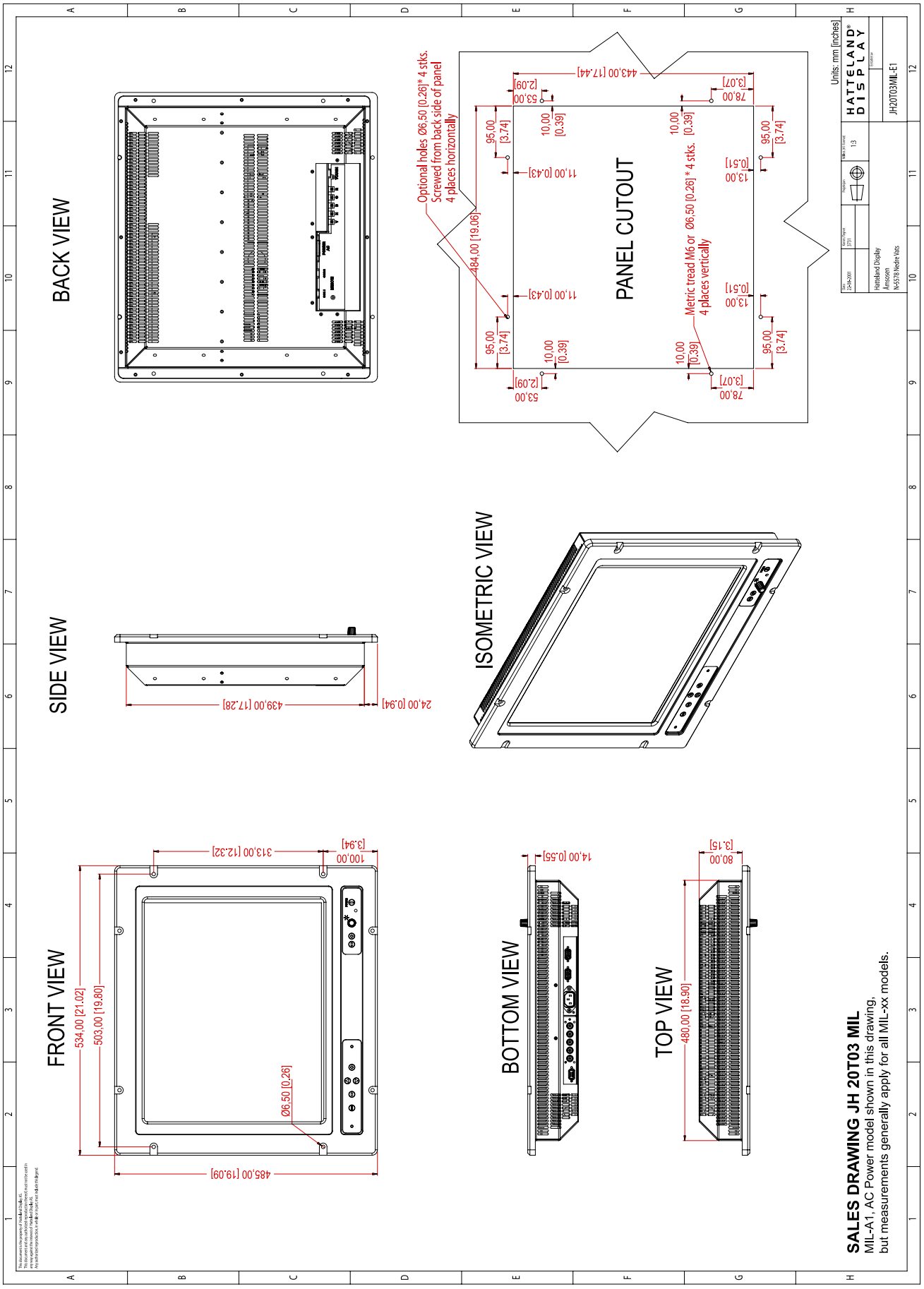
Technical Drawings

Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.



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Technical Drawings - Accessories

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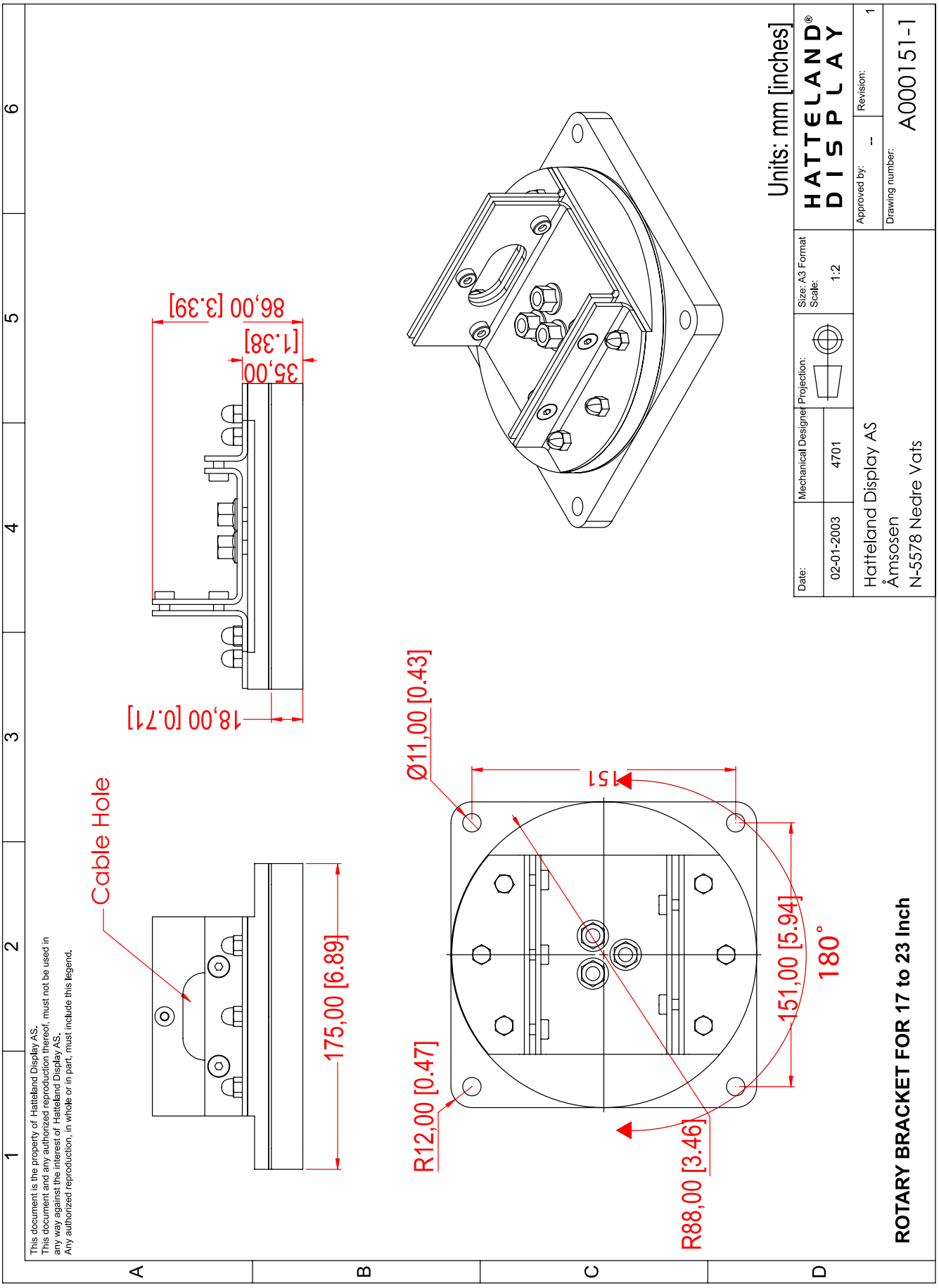

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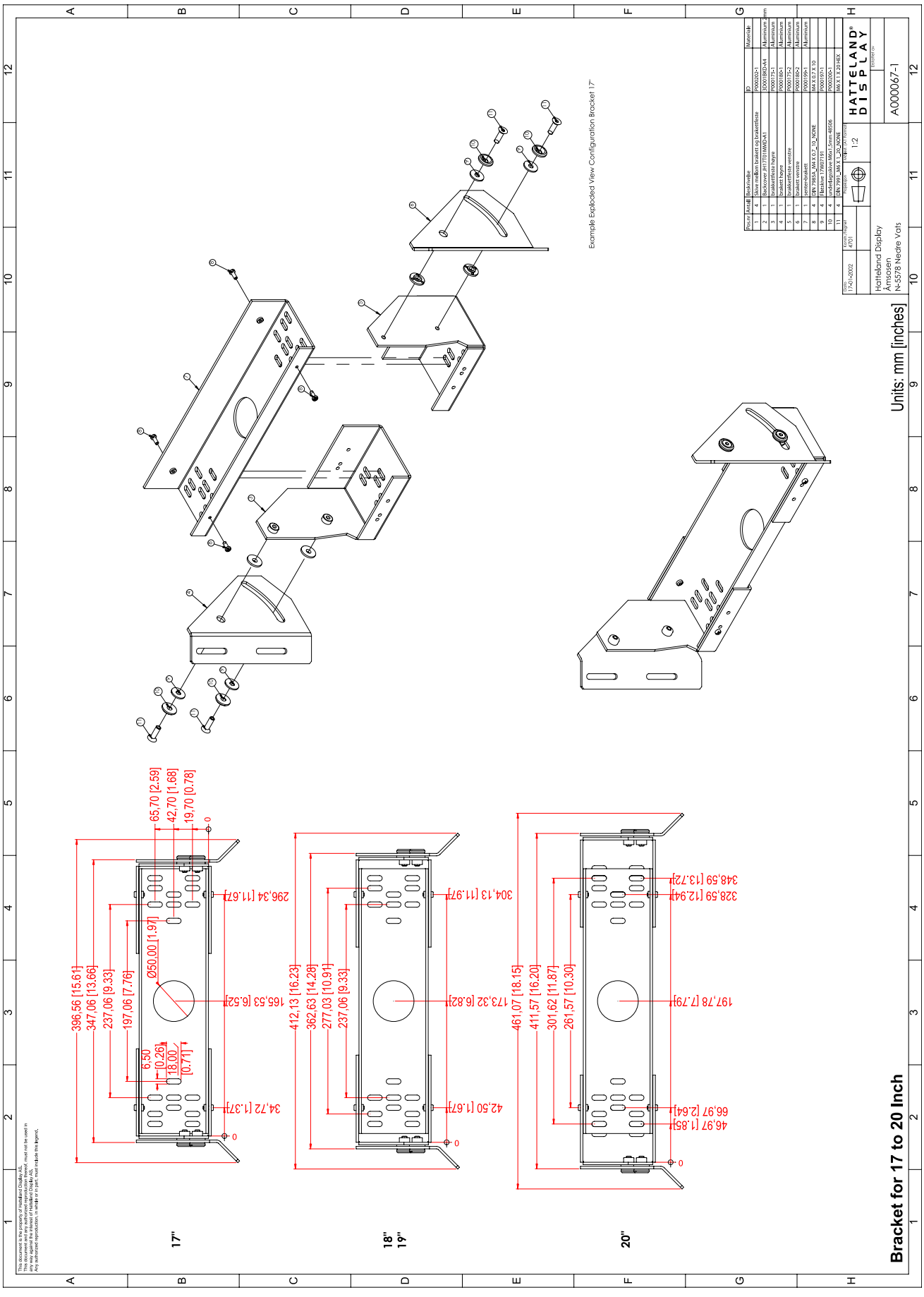

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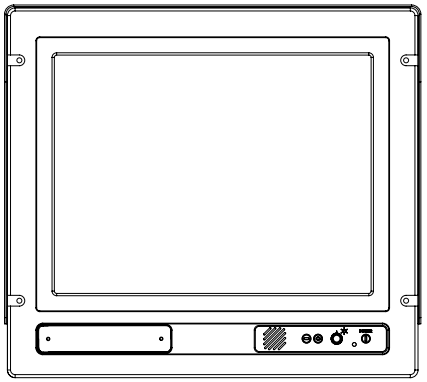
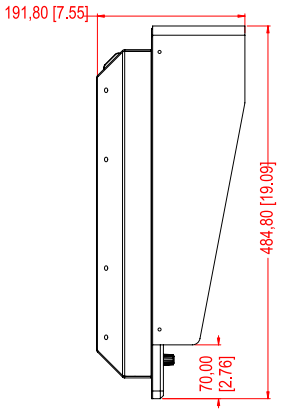
HATTELAND STANDARD

Material type and Quality:	Surface treatment:
Aluminium (Al) standard EN 485-2 [1.0-2]	(1) TROTEN (Electrolytic Phosphatizing)
Steel, Mild (Fe) standard EN 10270-1 [1]	(2) Powder coating (Ral, NCS) EROM DIRECTUM
Stainless Steel (SS) EN 1.4404 or ASTM 316L	(3) Anodizing (Clear, Black) EROM DIRECTUM
Welding specification:	Tolerance:
ISO 5817 Level C	ISO 2768-1 - middel
Sheet metal fasteners:	
PEM® fasteners or equivalent (www.pemnet.eu)	

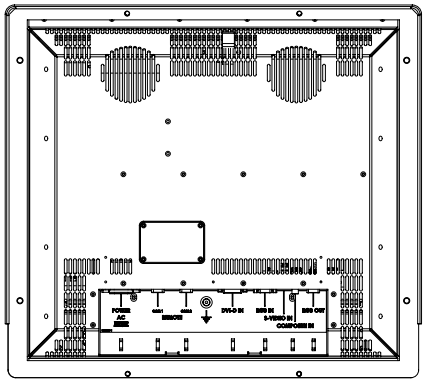
FRONT VIEW



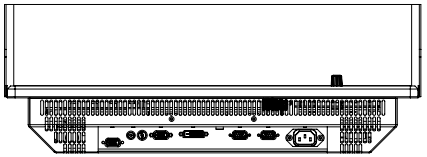
SIDE VIEW



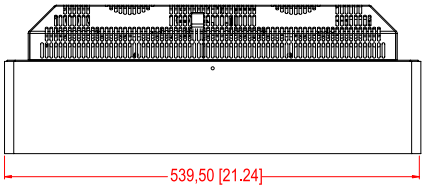
BACK VIEW



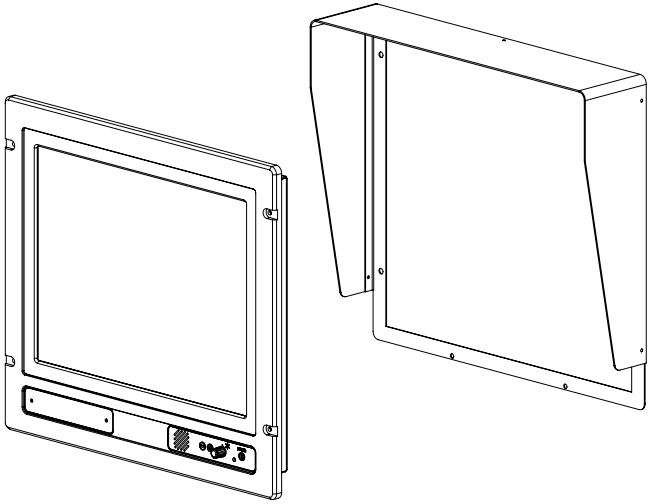
BOTTOM VIEW



TOP VIEW



DIMETRIC EXPLODED VIEW



Units: mm [inches]

SUN VISOR for 20 Inch

NOTE: The display unit shown in this drawing is for illustrative purposes only and may not be coherent with your actual product design.
The accessory and measurements illustrated are based on our form-fit-function philosophy and should fit older and newer display revisions, unless noted otherwise.

Date:	Mechanical Designer	Projection:	Size: A1 Format	HATTELAND® DISPLAY
			Scale: 1:3	
Hatteland Display Åmsosen N-5578 Nedre Vats			Colour code:	Approved by: / Revision:
			Surface treatment:	Drawing number:

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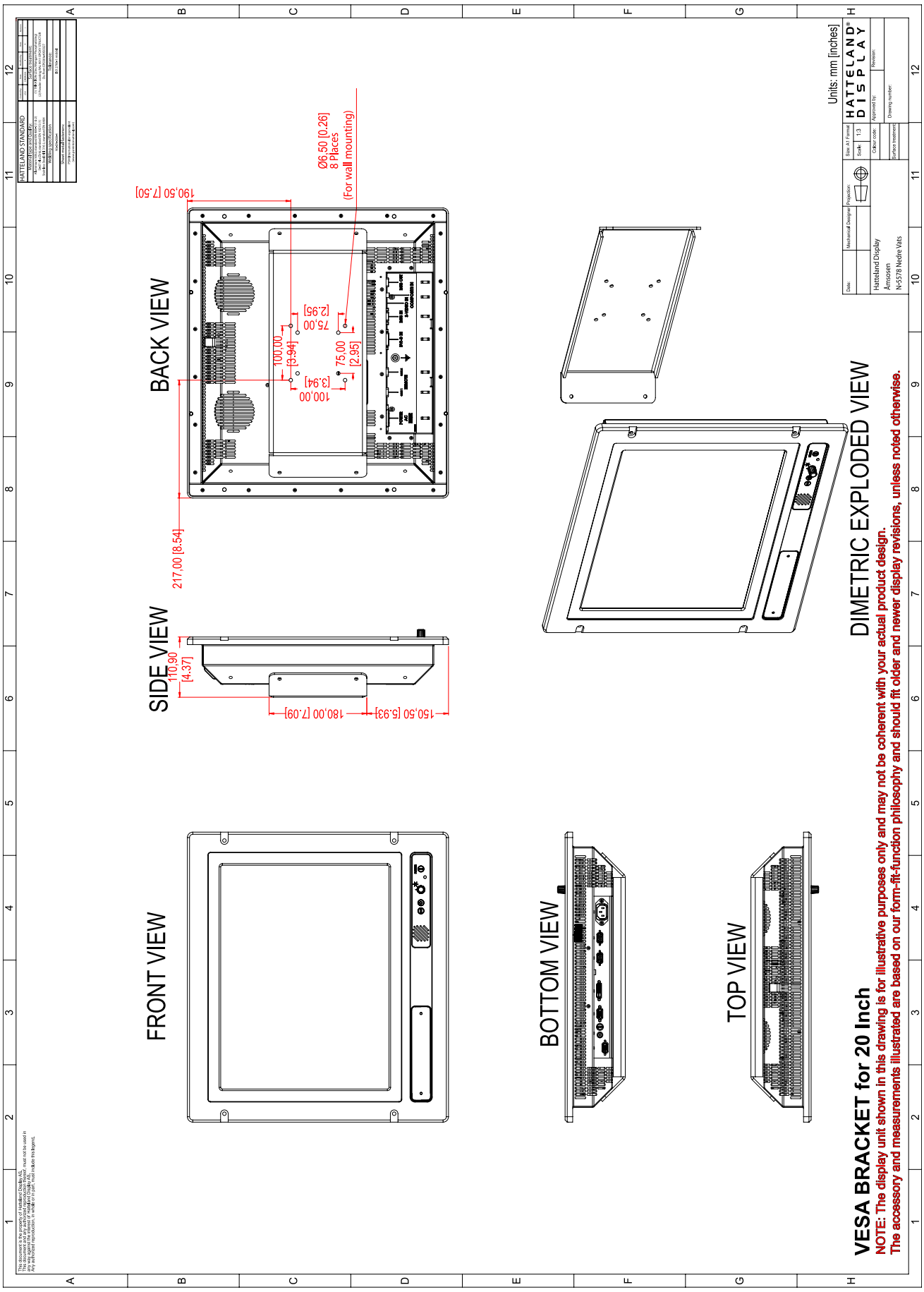

Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

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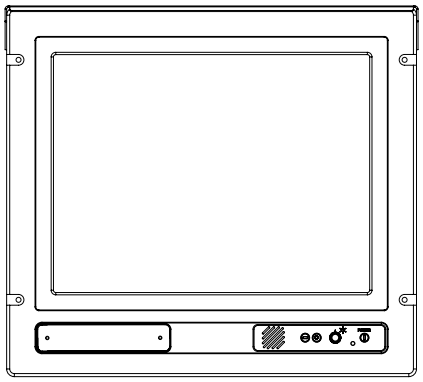
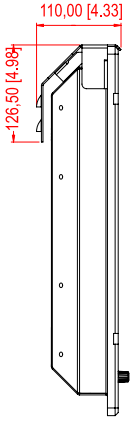
HATTELAND STANDARD

Material type and Quality:	Surface treatment:
Aluminium AlMg3, standard EN 485-2 / 5 to 7 Hg/m standard EN 1670 / 3	ALTROTEX Ultra Nitrogen Phosphating/ UV Powder coating Min. RAL 9005 (TGIC Free)
Stainless Steel AISI 316L standard EN 1669	Du Pont 2026-w95927
Welding specification	Tolerance:
ISO 5817-C	ISO 2768-1 middle
Sheet metal fasteners:	
PEM International snap acuators www.pemnetherlands.com	

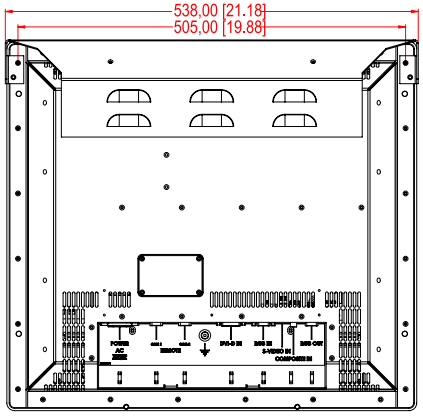
FRONT VIEW

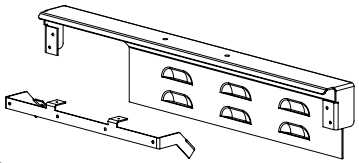


SIDE VIEW

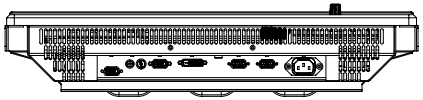


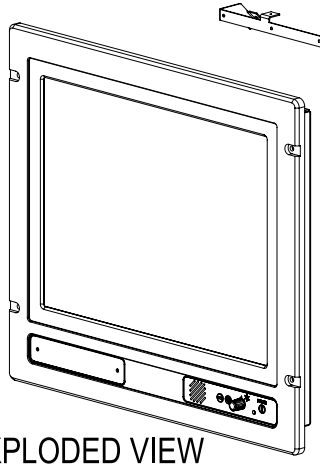
BACK VIEW



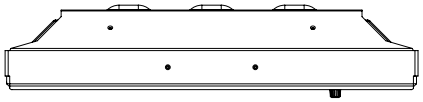


BOTTOM VIEW





TOP VIEW



DIMETRIC EXPLODED VIEW

Units: mm [inches]

Water Cover for 20 Inch

NOTE: The display unit shown in this drawing is for illustrative purposes only and may not be coherent with your actual product design.
The accessory and measurements illustrated are based on our form-fit-function philosophy and should fit older and newer display revisions, unless noted otherwise.

Date:	Mechanical Designer	Projection:	Size: A1 Format	HATTELAND® DISPLAY
			Scale: 1:3	
Hatteland Display Åmsosen N-5578 Nedre Vats			Colour code:	Approved by: / Revision:
			Surface treatment:	Drawing number:

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Appendixes

Installation in unit

Connectorization

The remote control interface communicates with external equipment via the appropriate connector(s). Some units may need a custom cable to operate properly. Please review the “Physical Connections” and the “Pin Out Assignments” chapter of the units user manual to determine the correct connectorization and installation of cables and connectors before proceeding into this chapter on the following pages.

For systems with more than one unit, the units are connected together through the unoccupied D-SUB (if available). It is regardless which one is used, but normally COM-1 is connected to another unit, and COM-2 is connected to the external PC.

Address

A unit’s address is set by a 5-bit dipswitch (red) on the backside of the unit (own page in this manual describes its location). Only bits 1-4 are currently in use. The position of bit 5 has no effect.Address is adjusted according to the following table:

Address	**Bit 1**	**Bit 2**	**Bit 3**	**Bit 4**
0	Off	Off	Off	Off
1	On	Off	Off	Off
2	Off	On	Off	Off
3	On	On	Off	Off
4	Off	Off	On	Off
5	On	Off	On	Off
6	Off	On	On	Off
7	On	On	On	Off
8	Off	Off	Off	On
9	On	Off	Off	On
10	Off	On	Off	On
11	On	On	Off	On
12	Off	Off	On	On
13	On	Off	On	On
14	Off	On	On	On
15	On	On	On	On

Selecting communication mode:

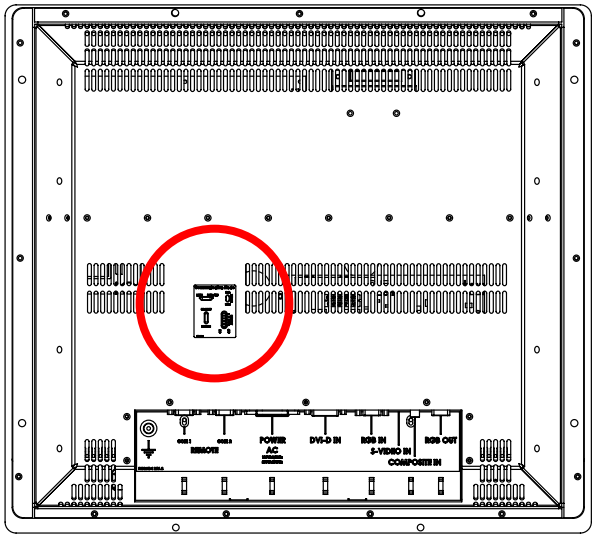
		Communication mode (U5)	Duplex (U8)
RS-232		RS232	-
RS-485	Full duplex	RS422/485	Full (on)
	Half duplex		Half (off)

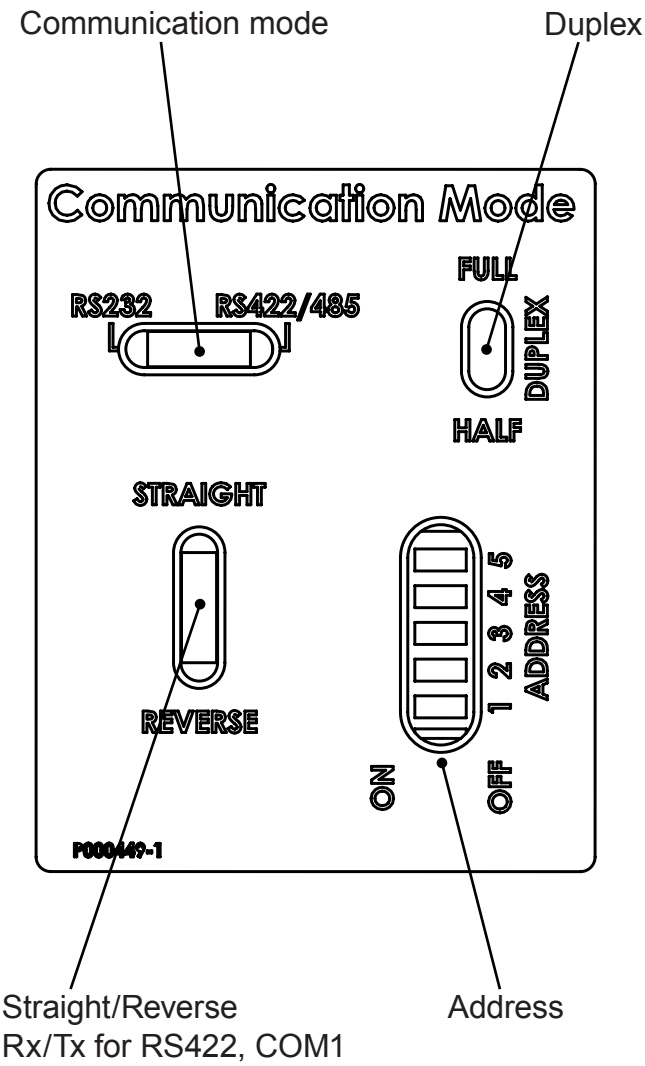
These settings are normally carried out by manufacturer before delivery.

Comm settings #1 (before Jan 2005 - pre-HW01 models)

The communication options are set by switches, placed at the backside of the unit. For most units, these switches are labelled like seen on the illustration below. For adjustments, a thin object is required for reaching the switches. Some units do not have this label or the dedicated holes. To change the settings, these switches can either be reached through the ventilation holes or the back cover must be demounted.

NOTE: The placement of the switches may vary from product to product!
By factory default the comport is set to RS232 mode, unless customer specified.



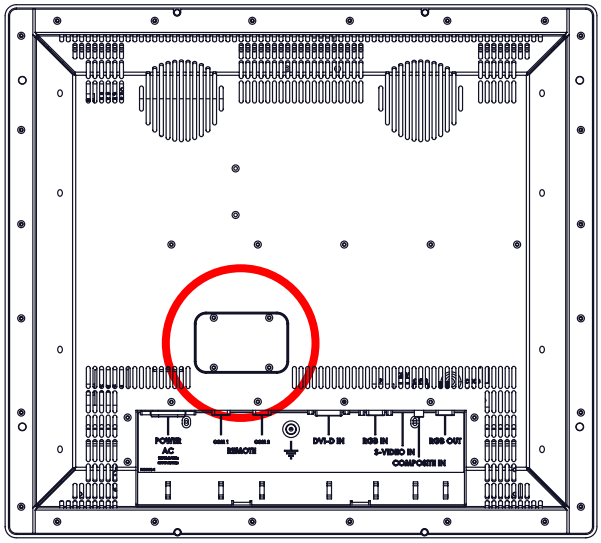


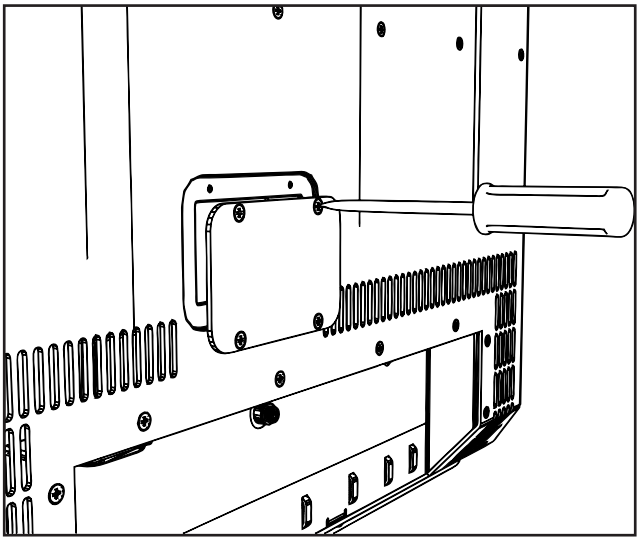
Note: JHSCOM placement for products released and introduced BEFORE Jan 2005

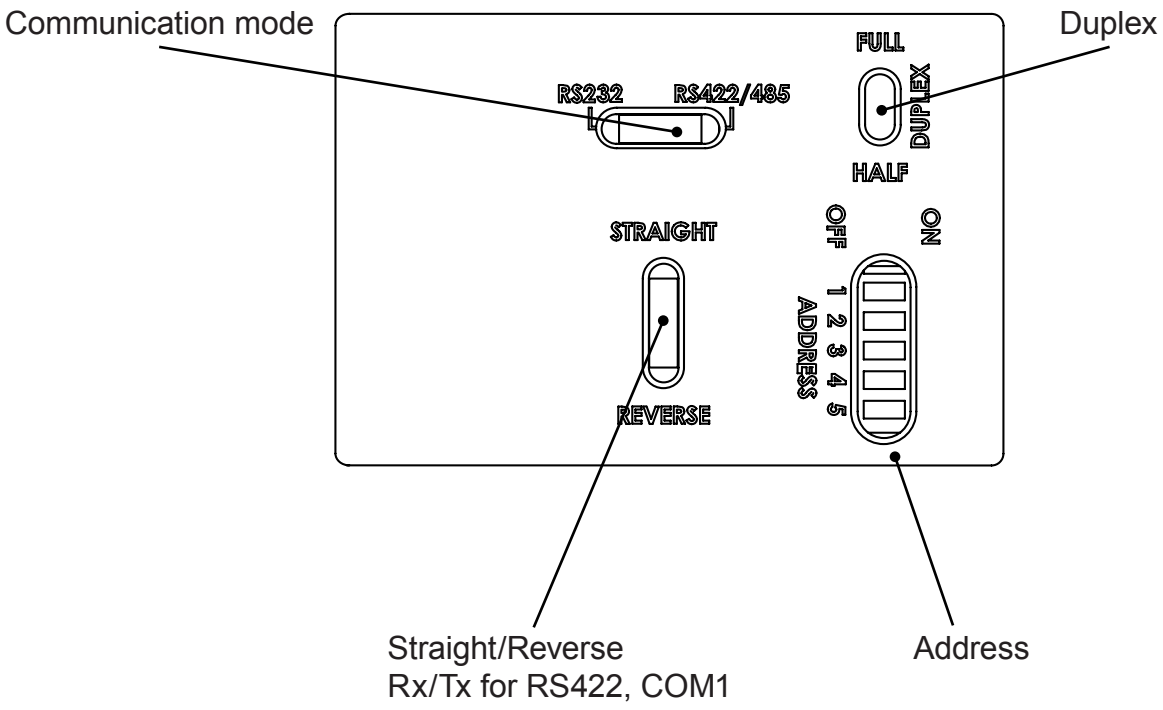
Comm settings #2 (after Jan 2005 - HW01 models)

The communication options are set by switches, placed at the backside of the unit. These switches are protected behind a hatch mounted with four screws. Unscrew those, and remove the hatch. The communication settings are placed like seen on the illustration below. For adjustments, a thin object is required for reaching the switches.

NOTE: By factory default the comport is set to RS232 mode, unless customer specified.







Note: JHSCOM placement for products released and introduced AFTER Jan 2005

HATTELAND® SCOM A1 & C1 Control Interface

This document defines the electrical signals, connectorization, serial data format, and communication protocol of the A1 and C1 version Serial Communication Control Interface. Difference between A1 and C1 is that C1 version provides filtered Dsub contacts for military applications. The purpose of this interface is to provide means for a computer application to control the LCD backlight and menu of one or more units. By units we refer to either displays or panel computers.

Interface configuration

The serial interface can have different configurations, selected by three switches.
The configurations are defined as follows:

RS 232		One computer controls one unit, no individual address
RS 485	Half duplex	One computer controls max 16 units, each with individual address.
	Full duplex	

Brightness Control Operation

The backlight brightness at the unit can be controlled in two modes. A serial interface is used to command the level of backlight brightness and to select mode.

1) Using the local manual brightness control, an operator is only able to adjust brightness to levels lower than the set maximum, including dimming the backlight to extinction.

2) Brightness is independent of local manual brightness control, set by remote control only.

Electrical Interface

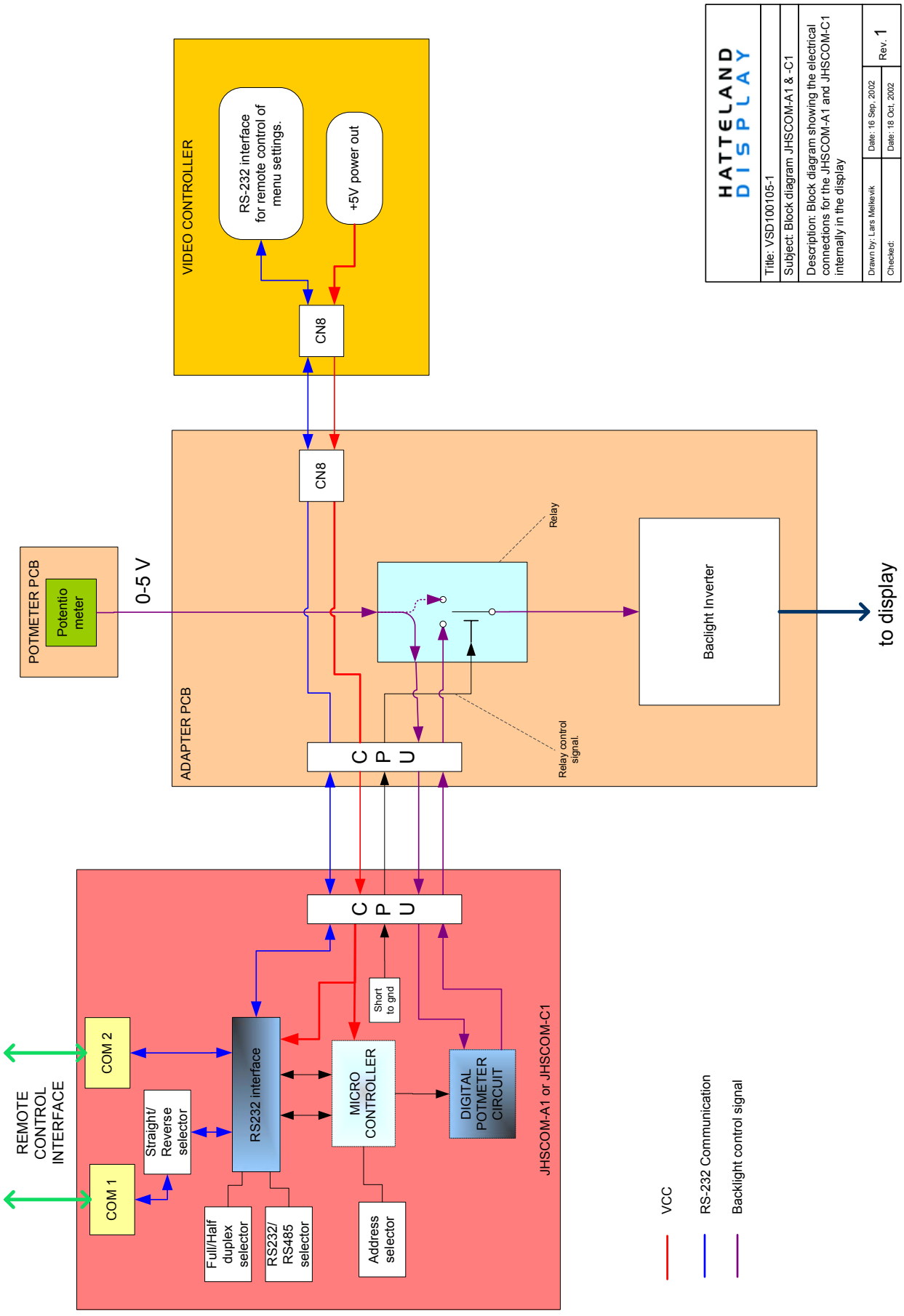
Electrical signals shall conform to RS-485, RS-422 or RS-232. Only Receive Data, Transmit Data, and Signal Ground are used. The same conditions apply for both RS-422 and RS-485, and will just be referred to as RS-485 further on in this document. Hardware handshake is only supported by loopback handshake for RS-232.

Dual 232 and 485 Electrical Interface

Of the two types of electrical interfaces 232 and 485, only one type shall be connected in a given installation, not both. Both receive and transmit capabilities shall be supported. 485 interface supports both half and full duplex. Electrical interface and duplex are selected with switches at the back of the display

Cable

A cable with an overall shield terminated at the back shell should be used.


HATTELAND DISPLAY
Title: VSD100105-1
Subject: Block diagram JHSCOM-A1 & -C1
Description: Block diagram showing the electrical connections for the JHSCOM-A1 and JHSCOM-C1 internally in the display
Drawn by: Lars Melkevik
Date: 16 Sep, 2002
Checked:
Date: 18 Oct, 2002
Rev. 1
VIDEO CONTROLLER
RS-232 interface for remote control of menu settings.
+5V power out
CN8
CN8
POTMETER PCB
Potentio meter
0-5 V
ADAPTER PCB
Relay
Relay control signal.
C P U
Baclight Inverter
to display
C P U
REMOTE CONTROL INTERFACE
COM 2
COM 1
Straight/ Reverse selector
RS232 interface
MICRO CONTROLLER
Short to gnd
DIGITAL POTMETER CIRCUIT
Full/Half duplex selector
RS232/ RS485 selector
Address selector
JHSCOM-A1 or JHSCOM-C1
VCC
RS-232 Communication
Backlight control signal

Connectorization at unit

The unit provides two or one 9 pin D-shell with socket contacts (depending on model).
Pin assignments at the unit are as shown below.

Pin	RS 232	RS422/ RS 485 full duplex	RS 485 half duplex
1	+5V	+5V	+5V
2	Tx	RxD-	-
3	Rx	TxD+	Data +
4	-	GND	GND
5	GND	GND	GND
6	-	GND	GND
7	-	RxD+	-
8	-	TxD-	Data -
9	GND	GND	GND

For full duplex RS-485 , the receive and transmit pins can be altered at COM2. That is: Tx- at pin 2, Rx+ at pin 3, Tx+ at pin 7 and Rx- at pin 8. This can be done to simplify connections, as only one to one cables are needed throughout an installation of several units. The alteration is selected by a slide switch on the Remote PCB labelled “one to one” and “rx to tx”.

Serial Communication (SCOM) Interface

Data Rate
The unit is configured to transmit and receive data at 9600 bits/second.

Data Format
Data shall be transmitted with no parity, 8 data bits, one start bit, and one stop bit.

Message Format
The basic message format shall be as follows:

Byte #	0	1	2,3,4	5	6	7, etc	7+LEN
	ATTN	ADDR	CMD	LEN	IHCHK	DATA	IDCHK

The minimum message size is 7 bytes. The maximum message size is 82 bytes, consistent with 61162-1.

Attention (ATTN)
This byte is used to identify a start of message. It can be one of 3 values:

ATTN	Description	
0x07	Command	(ASCII BELL)
0x06	Acknowledge	(ASCII ACK)
0x15	Negative Acknowledge	(ASCII NAK)

A device shall send a command using the 0x07 Attention Code. The unit will respond to the command with either an ACK if the command completed successfully, or a NAK if the command failed.

Address (ADDR)
This byte is used to specify a particular unit to receive a Command and to identify the unit responding (ACK or NAK) to a Command. All units will support the broadcast address. The unit will meet all functional requirements without individual unit addressing.

The Address field shall have the following values:

ADDR	Description
0xFF	Broadcast - Addressed to all units
0x00 to 0x0F	Address of a specific unit (max of 16 units)

Command (CMD)
The command shall be one of the following values:

CMD 0	CMD 1	CMD 2	ASCII	Description
0x42	0x52	0x54	“BRT”	Brightness Command
0x4D	0x41	0x4E	“MAN”	Manufacturer ID Code
0x56	0x45	0x52	“VER”	Unit ID Version Number
0x50	0x4F	0x54	“POT”	Potentiometer control
0x4D	0x43	0x43	“MCC”	Unit Control Command*
0x54	0x59	0x50	“TYP”	Type/Model Number Command
0x45	0x45	0x43	“ETC”	Elapsed TIme Counter**

*Note: This command is not available for Maritime Multi Computer (MMC) units.
**Note: This command is not available for pre Feb 2005 units

Data Length (LEN)
This byte defines the length of DATA in the message in bytes. The maximum value for this field shall be 74 bytes. The minimum value is 0 bytes.

Inverse Header Checksum (IHCHK)
This is a simple 8-bit checksum of the header data, message bytes 0 to 5 on which a bit-wise inversion has been performed. The checksum shall be initialised to 0. The 8-bit sum (without carry) of bytes 0, 1, 2, 3, 4, 5 and 6 shall be 0xFF.

To any message that fails the checksum, the receiver shall reply with the attention code set to NAK and no data field. This requirement does not apply to Broadcast messages in RS-485 (for units that support it) mode, in which case there will be no reply.

Data Field (DATA)
The DATA field shall only be transmitted if LEN is greater than 0. This field is dependent upon the CMD transmitted.

Inverse Data Checksum (IDCHK)
These bytes shall only be transmitted if LEN is greater than 0. This is a simple 8-bit checksum of the data field, message bytes 7 to 7+(LEN-1) on which a bit-wise inversion has been performed. The checksum shall be initialized to 0. The 8-bit sum (without carry) of bytes 7 through 7+LEN inclusive shall be 0xFF. The receiver will reply to any message that the checksum has failed with the attention code set to NAK. This requirement does not reply to broadcast messages in RS-485 (for units that support it) mode, in which case there will be no reply.

Message Commands
The following sections define the message formats for each of the specific commands.

Brightness Command "BRT"
This command shall be sent to the unit to command the backlight brightness control setting.The brightness value shall be sent as 1 byte in the DATA field. A setting of 0x00 will indicate off. A setting of 0xFF will indicate maximum brightness. Intermediate values will control brightness over the range from minimum to maximum luminance.

If the data checksum is valid and the brightness was set, the unit will reply to this command with an ACK attention code. The DATA field in the reply shall indicate the resulting brightness control setting. If an invalid checksum was received and the message was not Broadcast and RS-485 (for units that support it), the unit will reply with an NAK attention code. The DATA field in the reply will indicate the current brightness control setting.

Examples:
Command 60% Brightness:

0x07	0xFF	0x42	0x52	0x54	0x01	0x10	0x99	0x66

Acknowledge 60% Brightness:

0x06	0xFF	0x42	0x52	0x54	0x01	0x11	0x99	0x66

Negative Acknowledge 40% Brightness:

0x15	0xFF	0x42	0x52	0x54	0x01	0x02	0x66	0x99

Manufacturer ID "MAN"

This command shall be sent to the unit to request Manufacturer ID Code. No data shall be sent with this command. The unit will reply to this command with an ACK attention code. The DATA field will be set to an ASCII string value that is unique for each manufacturer.

Examples:
Command Manufacturer ID Code:

0x07	0xFF	0x4D	0x41	0x4E	0x00	0x1D

Acknowledge Manufacturer ID Code "JHD":

0x06	0xFF	0x4D	0x41	0x4E	0x03	0x1B	0x4A	0x48	0x44	0x29

Unit ID Model/Version Number "VER"

This command shall be sent to the unit in order to identify unit type by preassigned code and, establish the version of the serial communications interface software. No data shall be sent with this command.

Any future revisions, such as additions or changes to the commands or data fields shall be coordinated with a difference in the unit Version Number. The unit will reply to this command with an ACK attention code. The DATA field has a unique 1-byte unit model code. The next 2 bytes shall contain major and minor version of the serial communication protocol in use. Currently the unit model field is set to 0x01. The Version Number field for version 1 is set to 0x01 0x00.

Examples:
Command Unit Model/Version Number:

0x07	0xFF	0x56	0x45	0x52	0x00	0x0C

Unit Version 1.0:

0x06	0x05	0x56	0x45	0x52	0x03	0x04	0x01	0x01	0x00	0xFD

Potentiometer control "POT"

The unit may allow the backlight to be controlled by the local control (potentiometer) mounted on the front of the unit by the remote control, or by the combination of the two. This command provides means to enable/disable the potentiometer. LEN = one data byte.

0x00	Disables the potentiometer. Backlight controlled only by the remote control.
0xFF	Enables the potentiometer. Backlight is controlled by both the remote serial interface and the potentiometer. (Default) Note: In this setting, with the BRT command at 100%, the front potentiometer has full control of the backlight. This is the initial setting when a unit is powered on.

If the data checksum is valid, the unit will reply to this command with an ACK attention code. The DATA field will indicate the resulting control setting. If an invalid data checksum was received and the message was not broadcast and RS485 (for units that support it), the unit will reply with a NAK attention code and the current control setting.

Unit control command "MCC"

This command is used for communication with the video interface controller of the unit to allow remote command of the unit's setup parameters. The video controller commands are transmitted in the data field. See appendix for complete list of controller commands. Please note that this feature is not supported by all video controllers / units.

For future products, it can not be guaranteed that all commands will still be available.
Note: Maritime Multi Computer (MMC) units do not have a video interface controller internally and the MCC command is therefore not supported.

If the checksum is valid, the unit will reply to this command with an ACK attention code, where the data field contains the original command followed by acknowledge from the controller, as described in the appendix. If the checksum is invalid and the message was not broadcast and RS-485 (for units that support it), the unit will reply to this command with a NAK attention code, where the data field contains the original command.

Examples:
Command 50% contrast 0x82 0x41 0x38 0x30:
(50% of 0xFF=0x80. In ASCII 80 will be: 0x38 0x30)

0x07	0xFF	0x4D	0x43	0x43	0x04	0x22

0x82	0x41	0x38	0x30	0xD4

Acknowledge 50% Contrast:

0x06	0x03	0x4D	0x43	0x43	0x06	0x1D

0x82	0x41	0x38	0x30	0x38	0x30	0x6C

Unit Type/Model Number "TYP"

This command shall be sent to the unit in order to identify the unit type by its model number / part number. No data shall be sent with this command.

The unit will reply to this command with an ACK attention code. The DATA field will be set to an ASCII string to indicate the specified Type/Model Number, e.g: "JH23T01MMD-A1"

Examples:
Command Type/Model Number

0x07	0xFF	0x54	0x59	0x50	0x00	0xFC

Acknowledge Type/Model Number "JH20T03":

0x06	0xFF	0x54	0x59	0x50	0x07	0x1A

0x4A	0x48	0x32	0x30	0x54	0x30	0x33	0x54

Operational Requirements

The following sections define the operational requirements.

Initial and Default Unit Conditions

After any power cycle, the unit will start-up with the maximum brightness control range available at the local control and with combined control of the backlight enabled from both the local control (potentiometer) and the remote BRT command. If no serial messages are received, the unit will stay in this configuration.

Serial Message Failure
If serial messages stop being transmitted or are corrupt, the unit will remain at the last commanded brightness.

Periodic Messages
The Brightness Command shall be transmitted to the unit at a repetition no faster than 4 Hz.

Fault Detection and Power Interruption Recovery
To support implementation of keep-alive alarm logic in application software on the computer, the Brightness Command message output from the computer to the unit can be repeated once per second, driven by receiving valid acknowledge messages from the unit. The keep-alive logic should tolerate intermittent loss of valid acknowledge messages without activating an alarm.

Response Time

Individually Addressed Command Response
The unit will output the required response within Tr = 2.5 character periods after the last byte of a command message is received (2.6mS at 9600 bit/sec), except as specified herein.

Elapsed Time Counter "ETC"
Note: This command is not available on pre Feb 2005 units.
The unit features an elapsed time counter which counts the total number of hours that the unit has been switched on. The ETC command can be sent to the unit to acquire the elapsed time in hours. No data shall be sent with this command. The unit will reply to this command with an ACK attention code. The DATA field will be set to a three byte string, where the most significant byte is transmitted first.

The ETC has a limit on maximum 298.261 hours, equivalent to 34 years. When this number is reached, the ETC will stop counting, and the ETC command will always reply with maximum number of hours.

Examples:
ETC Command:

0x07	0xFF	0x45	0x54	0x43	0x00	0x1D

Answer, two hours elapsed time:

0x06	0xFF	0x45	0x54	0x43	0x03	0x1B	0x00	0x00	0x02	0xFD

Broadcast Command Response

In response to RS-485 (for units that support it) broadcast command messages, after the last byte of the command message is received, all units will reply within the time period defined for Te, below. Further more, any gap between these individual responses will be less than the Intermessage Gap, defined below.

Te = (Tr + Lr) * N, where
Lr = length of the ACK/NAK message response
Tr = response time
N = the total number of units. *

*) As the units reply in order to their address, the units must be given subsequent addresses, starting at zero, for N to equal the total number of units. If not, N = the highest unit address + 1.

The maximum Lr for each command are shown in the table below:

Command	BRT	MAN	VER	TYP	POT	MCC
Lr	9	13	11	28	9	17

Example: For the BRT command, and 8 units, this corresponds to
Te = (2.5 * 10 + 9 * 10) * 8 / 9600 = 95.8 ms

MCC Response

For broadcast messages in RS485 (for units that support it) mode, the data field of an ACK is limited to 9 bytes, and LEN of command + LEN of ACK is limited to 14. This leads to the response time: 102ms + N * 21ms.

Inter-message Gap

Following an individually addressed command, the next command shall not be issued until at least Tg = 5 character periods after the ACK or NAK message received. At 9600, that is 5 * 10 / 9600 = 5.2ms.

Following the issue of a broadcast command message, the next command shall not be issued until at least Tc = Te + Tg, where Te is as defined for Broadcast Command response and Tg is defined above.

Unit Response and Addresses

When individual unit addressing is supported by an installed configuration of units in a RS-485 (for units that support it) system, a separate ACK or NAK message for each unit will be transmitted providing each unit's individual address in response to any broadcast-addressed Command.

NAK messages will not be generated when an error in a Broadcast message is detected. When individual unit addressing is not supported, the unit will only respond to the broadcast address and will include the broadcast address in the ACK and NAK messages. NAK messages will not be generated when an error in a Broadcast message is detected.

When a unit receives an incomplete message and the next byte is not received until after a time equal to the Intermessage Gap, the next bytes received shall be processed to check for the start of a new command (0x07, ASCII Bell).

If the header checksum is valid, but the first byte of the command message is not 0x07, as specified, the unit may wait until after the next inter-message gap to resume checking. A NAK message shall not be generated.

If the header checksum is valid, but the value of the CMD field does not equal one of the defined commands, the unit shall reply by generating a NAK message as though a VER command had been received.

If the header checksum is valid, but the value of the LEN field is greater than the maximum allowed, the unit shall ignore the message. A NAK message shall not be generated.

If the data checksum is valid, but the value in the DATA field associated with a command is invalid (out of range, undefined, etc.), the unit shall generate a NAK message indicating the current data value in the DATA field.

Additional Commands

In time, additional commands and corresponding data fields may be defined. These additions will not conflict with the operation of the interface as defined herein.

(Note: Some commands may not be available on older models).

Revision 0.09.00

COMMAND TABLE

Commands to implement switch mount control buttons

Function	Command	Description	Acknowledge (if enabled)
Brightness control	0x81, nn | "+" | "-" | "r" | "R" | "?"	Set brightness = value/increment/decrement Reset Query	Brightness.
Contrast control - all channels	0x82, "a" | "A", nn | "+" | "-" | "r" | "R" | "?"	Set all contrast = value/increment/decrement Reset Query	Contrast.
Colour temperature select	0xb3, n | "r" | "R" | "?"	Select colour temperature = value Reset Query	Main selected. "0" – 9500K. "1" – 8000K. "2" – 6500K. "3" – 5000K.
Red level for selected colour temperature	0xb4, nn | "+" | "-" | "r" | "R" | "?"	Set the level of the red channel for the selected colour temp. = value/increment/decrement Reset Query	Red level for selected colour temperature.
Green level for selected colour temperature	0xb5, nn | "+" | "-" | "r" | "R" | "?"	Set the level of the green channel for the selected colour temp. = value/increment/decrement Reset Query	Green level for selected colour temperature.
Blue level for selected colour temperature	0xb6, nn | "+" | "-" | "r" | "R" | "?"	Set the level of the blue channel for the selected colour temp. = value/increment/decrement Reset Query	Blue level for selected colour temperature.
Frequency (In PC mode only)	0x8b, nnnn | "+" | "-" | "?"	Set H active size = Value/increment/decrement Query	Graphic mode H active size (in pixels)
Phase (tuning) control (In PC mode only)	0x85, nn | "+" | "-" | "r" | "R" | "?"	Set dot clock phase = value/increment/decrement Reset Query	Dot clock phase. (In PC mode only)
Picture Type (Video de-interlace method)	0xca, "0" | "1" "r" | "R" "?"	 De-interlace mode Reset Query	"0" – motion video. "1" – static picture. "2" – normal (non-flicker video mode)
OSD status enquiry	0xbb	Status of OSD	"0" – OSD turned off "1" – OSD turned on
Image H position	0x86, nnnn | "+" | "-" | "r" | "R" | "?"	Set img_hpos = value/increment/decrement Reset Query	Image horizontal position.
Image V position	0x87, nnnn | "+" | "-" | "r" | "R" | "?"	Set img_vpos = value/increment/decrement Reset Query	Image vertical position.

Video Controller Interface Commands

Function	Command	Description	Acknowledge (if enabled)
PIP window size select	0xa6, nn | “r” | “R” | “?”	Select PIP window size = PIP window size value Reset Query	Main selected. PIP off if “nn” = “00”.
PIP source select	0xa7, n | “r” | “R” | “?”	Select input main = Video source value Reset Query	Main selected. “0” – auto. “1” – Composite video. “2” – S-video. “3” – Component video.
PIP H position	0xa4, nnn | “+” | “-” | “r” | “R” | “?”	Set PIP_hpos = value/increment/decrement Reset Query	PIP window horizontal position.
PIP V position	0xa5, nnn | “+” | “-” | “r” | “R” | “?”	Set PIP_vpos = value/increment/decrement Reset Query	PIP window vertical position.
PIP brightness control	0xa2, nn | “+” | “-” | “r” | “R” | “?”	Set PIP window brightness = value/increment/decrement Reset Query	PIP window brightness.
PIP contrast control	0xa3, nn | “+” | “-” | “r” | “R” | “?”	Set PIP window contrast = value/increment/decrement Reset Query	PIP window contrast.
Tint control (for NTSC video mode only)	0x84, nn | “+” | “-” | “r” | “R” | “?”	Set tint = value/increment/decrement Reset Query	NTSC tint
Color control (for video mode only)	0x83, nn | “+” | “-” | “r” | “R” | “?”	Set color = value/increment/decrement Reset Query	PAL/NTSC color
Graphic Mode Sharpness (In RGB mode only)	0x89, n | “+” | “-” | “r” | “R” | “?”	Set graphic mode sharpness = Value/increment/decrement Reset Query	Graphic mode sharpness.
Video Sharpness (In video mode only)	0x8a, n | “+” | “-” | “r” | “R” | “?”	Set sharpness = value/increment/decrement Reset Query	Video Sharpness.
Video source type select (In video mode only)	0x9c, n | “r” | “R” “?”	Select video source type = Value Reset Query	Video source type: “0” – DVD “1” - VCR

Function	Command	Description	Acknowledge (if enabled)
Video System (In video mode only)	0x9b, “0” | “1” | “2” | “3” | “r” | “R” | “?”	Set video system = Auto/NTSC/PAL/SECAM Reset Query	“0” – Auto. “1” – NTSC_M_358 “2” – PAL_N_443 “3” – SECAM “4” – NTSC_M_443 “5” - PAL_M_358 “6” – NTSC_N_358 “7” – PAL_M_443 “8” – NTSC_N_443 “9” – PAL_N_358 (In video mode only)
Rotate video image	0xc7, “0” | “1”	Disable/enable video rotate	“0” – normal video image. “1” – rotated video image.
Scaling Mode	0x8c, “0” | “1” | “2” | “3” “r” | “R” | “?”	Set graphic image scaling mode = value Reset Query	Image expansion on/off. “0” – 1:1. “1” – fill screen. “2” – fill to aspect ratio “3” – non-linear scaling “4” – expand letterbox video to fill screen “5” – expand letterbox video (with subtitles) to fill screen “6” – keep aspect ratio of 4:3 video on 16:9 screen “7” – expand 4:3 letterbox video to aspect ratio (on 16:9 screen) “8” – expand 4:3 letterbox video (with subtitles) to aspect ratio (on 16:9 screen)
Scalar H pan position	0xb1, nnn | “+” | “-” | “r” | “R” | “?”	Set horizontal pan position for 1:1 scale mode = value/increment/decrement Reset Query	Scalar horizontal pan position.
Scalar V pan position	0xb2, nnn | “+” | “-” | “r” | “R” | “?”	Set vertical pan position for 1:1 scale mode = value/increment/decrement Reset Query	Scalar vertical pan position.
Scalar H Clipping	0xab, nnn | “+” | “-” | “r” | “R” | “?”	Set the horizontal clipping size for non-linear scale mode = value/increment/decrement Reset Query	Scalar horizontal clipping
Scalar H Offset	0xac, nnn | “+” | “-” | “r” | “R” | “?”	Set the horizontal offset of the display window for non-linear scale mode = value/increment/decrement Reset Query	Scalar horizontal offset.
Scalar H stretch	0xad, nnn | “+” | “-” | “r” | “R” | “?”	Set horizontal stretch factor for non-linear scale mode = value/increment/decrement Reset Query	Scalar horizontal stretch.

Video Controller Interface Commands

Function	Command	Description	Acknowledge (if enabled)
Scalar V Clipping	0xae, nnn | “+” | “-” | “r” | “R” | “?”	Set the vertical clipping size for non-linear scale mode = value/increment/decrement Reset Query	Scalar vertical clipping
Scalar V Offset	0xaf, nnn | “+” | “-” | “r” | “R” | “?”	Set the vertical offset of the display window for non-linear scale mode = value/increment/decrement Reset Query	Scalar vertical offset.
Scalar V stretch	0xb0, nnn | “+” | “-” | “r” | “R” | “?”	Set vertical stretch factor for non-linear scale mode = value/increment/decrement Reset Query	Scalar vertical stretch.
Select OSD language	0x95, n | “r” | “R” | “?”	Select language = English, Danish, Chinese Reset Query	“0” – English. “7” – Danish “8” – Chinese
Input main select	0x98, n | “+” | “-” | “r” | “R” | “?”	Select input main = PC or VIDEO or next available Reset Query	Main selected. “0” – PC. “1” – Composite video. “2” – S-video. “3” – Component video. “4” - DVI
Select menu timeout	0x93, nn | “+” | “-” | “r” | “R” | “?”	Select menu timeout = value/increment/decrement Reset Query	OSD menu timeout value. “00” – Continuous. value – Round up to nearest available step. if value > max available step, set it to the max available step.
DPMS Option	0x9f, “0” | “1” | “r” | “R” | “?”	Set power down option = On/Off Reset Query	“0” – Off. “1” – On.
Display Video Source Select	0xbc, “?” | “0” | “1”	 Query Name of video source not displayed. After switching to a new video source, the name of the video source is displayed for 5 seconds.	“0” – disabled. “1” – enabled.
Auto source select	0x99, “0” | “1” | “r” | “R” | “?”	Set exclusive or priority = Exclusive/Proirity Reset Query	“0” – Exclusive. “1” – Priority. “2” – Priority during power up.
GAMMA value select	0x9d, n | “r” | “R” “?”	Select GAMMA value = Value Reset Query	GAMMA value: “0” – 1.0, “1” – 1.6 “2” – 2.2, “3” – User Defined

Function	Command	Description	Acknowledge (if enabled)
Video Port Select	0xbe, ”0”, ”?” 0xbe “0” , “R” | “r” 0xbe, ”0”, n 0xbe, “1”, “?” 0xbe, “1”, “R” | “r” 0xbe, “1”, n 0xbe, “2”, “?” 0xbe, “2”, “R” | “r” 0xbe, “2”, n	Query Composite Video Port No. Set Composite Video Port No. = “0” Set Composite Video Port Number Query Svideo Port Number Set Svideo Port Number = “0” Set Svideo Port Number Query Component Video Port No. Set Component Vid. Port No. = “0” Set Component Video Port Number	“0n” – Port number
OSD H position	0x90, nnn | “+” | “-” | “r” | “R” | “?”	Set osd_hpos = value/increment/decrement Reset Query	OSD horizontal position.
OSD V position	0x91, nnn | “+” | “-” | “r” | “R” | “?”	Set osd_vpos = value/increment/decrement Reset Query	OSD vertical position.
OSD Transparency	0x92, n | “+” | “-” | “r” | “R” | “?”	Set OSD transparency = value/increment/decrement Reset Query	OSD tranparency.
Rotate OSD	0x8f, “0” | “1” | “?”	Disable/enable OSD rotate Query	“0” – normal OSD. “1” – rotated OSD.
Freeze frame	0xc6, “0” | “1”	Unfreeze / freeze frame	“0” – unfreeze. “1” – freeze.
Zoom level	0xa8, nn | “+” | “-” | “r” | “R” | “?”	Set Zoom level = value/increment/decrement Reset Query	Zoom level.
Zoom H position	0xa9, nnn | “+” | “-” | “r” | “R” | “?”	Set Zoom_hpos = value/increment/decrement Reset Query	Zoom window horizontal position.
Zoom V position	0xaa, nnn | “+” | “-” | “r” | “R” | “?”	Set Zoom_vpos = value/increment/decrement Reset Query	Zoom window vertical position.
Direct Access (Hotkeys)	0xa0, “1”, n | “r” | “R” | “?”	Set Hotkey 1= Value Reset Query	“0” – audio mute. “1” – volume. “2” – brightness. “3” – contrast. “4” – color. “5” – input source. “6” – video input. “7” – zoom “8” – freeze “9” – PIP “A” – Test Pattern “B” – No function

Video Controller Interface Commands

Function	Command	Description	Acknowledge (if enabled)
Direct Access (Hotkeys)	0xa0, "2", n | "r" | "R" | "?"	Set Hotkey 2 = value Reset Query	"0" – audio mute. "1" – volume. "2" – brightness. "3" – contrast. "4" – color. "5" – input source. "6" – video input. "7" – zoom "8" – freeze "9" – PIP "A" – Test Pattern "B" – No function
Set display orientation	0x8e, n | "r" | "R" | "?"	Set display orientation = value/increment/decrement Reset Query	"0" – normal. "1" – vertical inverse. "2" – horizontal inverse. "3" – inverted.
Auto-calibration	0xc5	Start auto-calibration of gain of the RGB amplifier.	"0" – fail. "1" – successful.
Set gamma data for user defined gamma curve	0xbf, mm, c, "?" 0xbf, "R" | "r" 0xbf, mm, c, nn	Query gamma data for color c index mm (c = 0 for color Red, c=1 for color Green, c=2 for color Blue) Set user gamma curve to linear Set gamma data for color c index mm. (If c= 3, then gamma data for red, green & blue will be set at the same time.)	"nn" = gamma data "1" "nn" = gamma data
Soft Power On/Off	0xc8, "0" | "1" | "?"	Soft power off/on query	"0" – soft power off. "1" – soft power on.
Query video input status	0xc9	Query the status of the primary & pip status	"nn" = input status 2nd digit = primary status: "0" : invalid "1" : connected to valid RGB "2" : connected to valid composite "3" : connected to valid Svideo "4" : connected to valid YcbCr "5" : connected to valid DVI 1st digit = PIP input status: "0" : invalid "2" : connected to valid composite "3" : connected to valid Svideo "4" : connected to valid YcbCr
Query BIOS version	0xcb, "0"	Read BIOS version	"nnnn" = BIOS ver. "nn.nn"
Query PCBA number	0xcb, "1"	Read PCBA number	"nnnn" = PCBA number
Query average picture level	0xcc, "0" | "1" | "2"	Read APL for red channel Read APL for green channel Read APL for blue channel	"nn" = average picture level
Test Pattern	0xcd, "0" | "1"	Leave test pattern display mode Display test pattern screen	"0" = normal display "1" = displaying built in test pattern
Load the factory default (Reset parameter)	0xce	Reset all parameters to default value	"1" – successful.

Function	Command	Description	Acknowledge (if enabled)
Saving the user default	0xd7	Saving all parameters to user default value	“1” - successful.
Loading the user default	0xd8	Loading all parameters to user default value	“1” - successful.
Volume control - left+right channel	0x80, “a” | “A”, nn | “+” | “-” | “r” | “R” | “?”	Set audio (L+R) volume = value/increment/decrement Reset Query	volume control
Volume control - on/off (mute)	0x80, “m” | “M”, “0” | “1” | “r” | “R” | “?”	Disable audio output. Enable audio output. Reset Query	“0” - audio off (muted). “1” - audio on.

Other Control

Function	Command	Description	Acknowledge (if enabled)
Select video mode	0xc2, nn	Current vmode = nn.	Current video mode selected.
Auto-setup	0xc3	Start auto-setup of current vmode.	“0” – fail. “1” – successful.
Command availability	0xc4, nn	Check whether a command is available.	“0” – not available. “1” – available.
Graphic horizontal resolution enquiry	0xb7	Horizontal resolution (in pixels) in 3 digit hex number	“nnn” = horizontal resolution
Graphic vertical resolution enquiry	0xb8	Vertical resolution (in lines) in 3 digit hex number	“nnn” = vertical resolution
Graphic horizontal sync frequency	0xb9	Horizontal sync frequency (in units of 100Hz) in 3 digit hex number	“nnn” = horizontal frequency
Graphic vertical sync frequency	0xba	Vertical sync frequency (in units of Hz) in 3 digit hex number	“nnn” = vertical frequency
OSD turn off	0xbd	Turn off the OSD.	“0” – fail. “1” – successful.

n = 1-byte ascii-coded hex number, e.g., parameter value of 0x1 is represented by “1” (0x31).
nn = 2-byte ascii-coded hex number, e.g., parameter value of 0x1e is represented by “1”, “e” | “E” (0x31, x6e|0x4e).

Remarks:

1. Command 0xcd is only available for new units (05 May 2003 and after).
2. If the data sent to the controller is out of range, the controller will not set that value and there will be no acknowledgement.
3. If the command sent to the controller is not available for that controller, there will be no acknowledgement.
4. The controller will respond to RS-232 command when the controller is in standby, no video input or normal operating condition.
5. If the following parameters are changed through RS-232: Power Down Option, Exclusive/Priority, Input Source, Video Input, the controller should change state according to the latest setting immediately.

Revision History - HATTELAND® SCOM

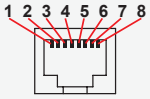
Rev.	By	Date	Notes
1	LM	26 Nov 2001	Preliminary release.
1	LM	06 Mar 2002	1'st Release Remote control interface specification
2	LM	06 Mar 2002	Changed Pin description for Half duplex RS-485.
2	TK	17 Oct 2002	Renamed document description to Specification of Serial Communication Control Interface. Corrected Pin assignment of RS-232 (Tx and Rx).
3	LM	22 Oct 2002	Added new MCC commands. Added Block diagram. Added paragraph about setting desired communication mode.
4	LM	08 May 2003	Corrected example for MCC command (50% contrast).
5	SE	11 Aug 2003	Minor spell checking and text formatting.
6	SE	19 Feb 2004	Added note about physical placement of the DIP switches. (May vary from product to product)
7	SE	24 Jan 2005	Updated Video Interface Commands
8	SE	23 Feb 2005	Added a new command. ETC (Elapsed Time Counter)
9	SE BU	18 Sep 2007	Revised hatch placement illustration. Changed layout of manual to current company profile. Changed document book ID from IND100004-1 to INB100018-1 due to conflict with earlier documentation. Changed word "display" & "displays" to "unit" & "units", since also certain Maritime Multi Computers may also have the ability to be controlled by SCOM. References to "JH SCOM" was replaced by "HATTELAND® SCOM".
10	BU SE	12 Nov 2009	Revised logo and profile. Added typenumber range on front page. (page 1) Added note for MCC command (not available on Maritime Multi Computers range) (page 8,11) Renamed document filename from: "INB100018-1_Specification of Serial Communication Control Interface_Series1" to: "INB100018-1_Technical_Manual_Serial_Communication_Control_Interface(SCOM_A1C1)_Series1"

Pin Assignments - Common Connectors

Note: Not all connectors may be available on your specific product. This depends on the amount of additional hardware installed from factory, or customized solutions. These pin assignments are for the common connectors used. Connectors are seen from users Point Of View (POV).

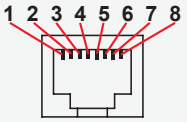
Pin Assignments - RJ45 10/100 LAN

Use category 5 - twisted pair cable



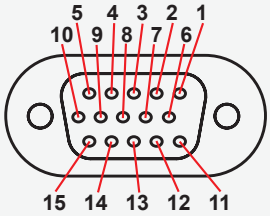
Pin 01 - TDP	Transmit Differential Pair (Positive)
Pin 02 - TDN	Transmit Differential Pair (Negative)
Pin 03 - RDP	Receive Differential Pair (Positive)
Pin 04 - NC	Not Connected
Pin 05 - NC	Not Connected
Pin 06 - RDN	Receive Differential Pair (Negative)
Pin 07 - NC	Not Connected
Pin 08 - NC	Not Connected

Pin Assignments - RJ45 10/100/1000 GBLAN



Pin 01 - D0P	Differential Pair 0 (Positive)
Pin 02 - D0N	Differential Pair 0 (Negative)
Pin 03 - D1P	Differential Pair 1 (Positive)
Pin 04 - D2P	Differential Pair 2 (Positive)
Pin 05 - D2N	Differential Pair 2 (Negative)
Pin 06 - D1N	Differential Pair 1 (Negative)
Pin 07 - D3P	Differential Pair 3 (Positive)
Pin 08 - D3N	Differential Pair 3 (Negative)

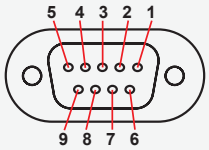
Pin Assignments - 15P HD RGB VGA



Pin 01	Red, analog
Pin 02	Green, analog
Pin 03	Blue, analog
Pin 04	Reserved for monitor ID bit 2 (grounded)
Pin 05	Digital ground
Pin 06	Analog ground red
Pin 07	Analog ground green
Pin 08	Analog ground blue
Pin 09	+5V power supply for DDC (optional)
Pin 10	Digital ground
Pin 11	Reserved for monitor ID bit 0 (grounded)
Pin 12	DDC serial data
Pin 13	Horizontal sync or composite sync, input
Pin 14	Vertical sync, input
Pin 15	DDC serial clock

Pin Assignments - 9P Serial COM RS-232

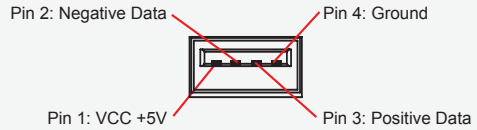
This connector is commonly used for:



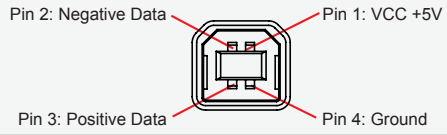
Pin 01 - DCD	Data Carry Detect
Pin 02 - SIN	Serial In or Receive Data
Pin 03 - SOUT	Serial Out or Transmit Data
Pin 04 - DTR	Data Terminal Ready
Pin 05 - GND	Ground
Pin 06 - DSR	Data Set Ready
Pin 07 - RTS	Request To Send
Pin 08 - CTS	Clear To Send
Pin 09 - RI	Ring Indicate

Note: The table above lists commonly-used RS-232 signals and pin assignments, however Serial Communication for Hatteland Display products may vary from product to product to support different end user systems. Please check additional pin assignments section in this manual for specific RS-232/RS-422/RS-485 pin assignments for your exact product.

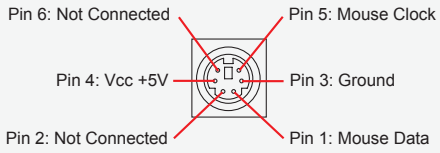
Pin Assignments - USB TYPE A



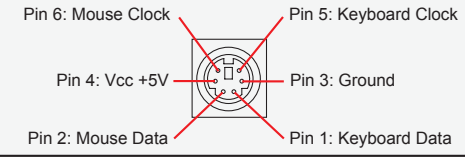
Pin Assignments - USB TYPE B



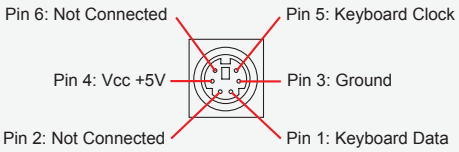
Pin Assignments - 5P PS/2 MOUSE



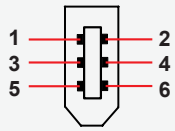
Pin Ass. - 5P PS/2 KEYBOARD+MOUSE Combined



Pin Assignments - 5P PS/2 KEYBOARD

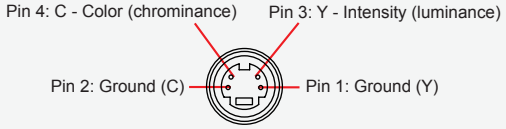


Pin Assignments - FIREWIRE IEEE-1394

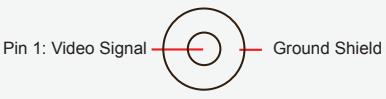


Pin 01 - VCC	Power
Pin 02 - GND	Grounding for power and inner cable shield
Pin 03 - TPB-	Twisted Pair B- Receive Strobe, Transmit Data
Pin 04 - TPB+	Twisted Pair B+ Receive Strobe, Transmit Data
Pin 05 - TPA-	Twisted Pair A- Transmit Strobe, Receive Data
Pin 06 - TPA+	Twisted Pair A+ Transmit Strobe, Receive Data

Pin Assignments - 5P S-VHS/S-VIDEO

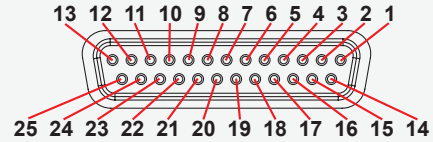


Pin Assignments - RCA/BNC 1P COMP. VIDEO



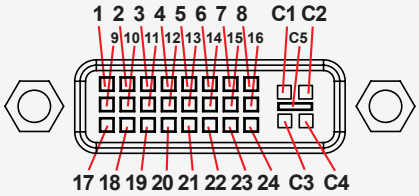
Pin Assignments - Common Connectors

Pin Assignments - 25P Parallel



Pin 01 - STROBE	This signal indicates to the printer that data at PD7..0 are valid.
Pin 02 - DATA0	Parallel data bus from PC board to printer. The data line are able to operate in PS/2 compatible bi-directional mode.
Pin 03 - DATA1	Same as Pin 02
Pin 04 - DATA2	Same as Pin 02
Pin 05 - DATA3	Same as Pin 02
Pin 06 - DATA4	Same as Pin 02
Pin 07 - DATA5	Same as Pin 02
Pin 08 - DATA6	Same as Pin 02
Pin 09 - DATA7	Same as Pin 02
Pin 10 - ACK	Signal from printer indicating that the printer has received the data and is ready to accept further data.
Pin 11 - BUSY	Signal from printer indicating that the printer cannot accept further data.
Pin 12 - PE	Signal from printer indicating that the printer is out of paper.
Pin 13 - SELECT	Signal from printer to indicate that the printer is selected.
Pin 14 - AUTO FEED	This active low output causes the printer to add a line feed after each line printed.
Pin 15 - ERR#	Signal from printer indicating that an error has been detected.
Pin 16 - INIT#	This active low output initialises (resets) the printer.
Pin 17 - SLIN#	Signal to select the printer sent from CPU board to printer.
Pin 18 - GND	Ground
Pin 19 - GND	Ground
Pin 20 - GND	Ground
Pin 21 - GND	Ground
Pin 22 - GND	Ground
Pin 23 - GND	Ground
Pin 24 - GND	Ground
Pin 25 - GND	Ground

Pin Assignments - 24P DVI-D & DVI-I



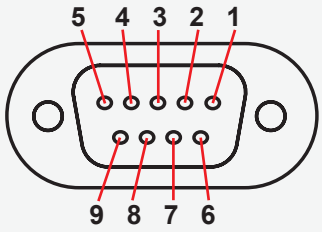
Pin 01	T.M.D.S. Data2 - (Digital - RED link 1)
Pin 02	T.M.D.S. Data2 + (Digital + RED link 1)
Pin 03	T.M.D.S. Data2/4 Shield
Pin 04	T.M.D.S. Data4 - (Digital - GREEN link 2)
Pin 05	T.M.D.S. Data4 + (Digital + GREEN link 2)
Pin 06	DDC Clock
Pin 07	DDC Data
Pin 08	Analog Vertical Sync (DVI-I only)
Pin 09	T.M.D.S. Data1 - (Digital - GREEN link 1)
Pin 10	T.M.D.S. Data1 + (Digital + GREEN link 1)
Pin 11	T.M.D.S. Data1/3 Shield
Pin 12	T.M.D.S. Data3 - (Digital - BLUE link 2)
Pin 13	T.M.D.S. Data3 + (Digital + BLUE link 2)
Pin 14	+5V Power (for standby mode)
Pin 15	Ground (for +5V and analog sync)
Pin 16	Hot Plug Detect
Pin 17	T.M.D.S. Data0 - (Digital - BLUE link 1) and digital sync.
Pin 18	T.M.D.S. Data0 + (Digital + BLUE link 1) and digital sync.
Pin 19	T.M.D.S. Data0/5 Shield
Pin 20	T.M.D.S. Data5 - (Digital - RED link 2)
Pin 21	T.M.D.S. Data5 + (Digital - RED link 2)
Pin 22	T.M.D.S. Clock Shield
Pin 23	T.M.D.S. Clock + (Digital clock + (Links 1 and 2)
Pin 24	T.M.D.S. Clock - (Digital clock - (Links 1 and 2)
Pin C1	Analog RED
Pin C2	Analog GREEN
Pin C3	Analog BLUE
Pin C4	Analog Horizontal Sync.
Pin C5	Analog Ground (return for RGB signals)

DDC = Display Data Channel /// T.M.D.S = Transition Minimized Differential Signal /// PIN C1,C2,C3,C4 = Only present on DVI-I connectors.
NOTE: Connector shows a DUAL LINK design, but some units may not support it. Only products with 1920x1200 or more in resolution require / support DUAL LINK.

Additional connector pinouts may be available in third party motherboard manuals, primarly for computers only. Please see manual/drivercd delivered with your product or own section in this user manual.

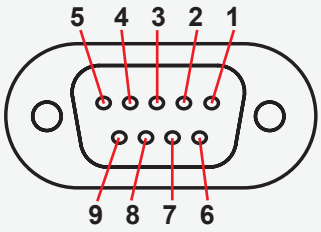
Pin Assignments - Common Connectors (Additional)

Pin Assignments - 9P Serial COM RS422



Pin 01 - N/C	Not Connected
Pin 02 - TX-	Transmit Data -
Pin 03 - RX+	Receive Data +
Pin 04 - N/C	Not Connected
Pin 05 - GND	Ground
Pin 06 - N/C	Not Connected
Pin 07 - TX+	Transmit Data +
Pin 08 - RX-	Receive Data -
Pin 09 - N/C	Not Connected

Pin Assignments - 9P Serial COM RS485



Pin 01 - N/C	Not Connected
Pin 02 - N/C	Not Connected
Pin 03 - DAT+	Data+
Pin 04 - N/C	Not Connected
Pin 05 - GND	Ground
Pin 06 - N/C	Not Connected
Pin 07 - N/C	Not Connected
Pin 08 - DAT-	Data-
Pin 09 - N/C	Not Connected

Note: These pin assignments applies for products with customer specified COM ports (pre-setup by the factory). These COM ports are set/configurable on the motherboard located inside the product. If the main cover of the product has to be unmounted and removed, the warranty will be void.

GENERAL ISSUES FOR TFT PANEL BASED PRODUCTS

Note: Applies for a range of various products. This is only suitable for general guidance.

NO PICTURE / LED BEHAVIOUR:
If there is no light at all in the LED at the FRONT, check power cables. If the LED in front is green then check if the brightness knob is turned to the right (max brightness). If still no picture, check if there is a VGA signal on the External VGA connector. If you have a picture on the external VGA connector please look in BIOS documentation/chapter for correct display settings in BIOS. Lack of image is most likely to be caused by incorrect connection, lack of power, or wrong BIOS settings.

SCROLLING / UNSTABLE IMAGE:
Signal cable may not be completely connected to computer or TFT display. Check the pin assignments and signal timings of the display and your video card with respect to recommended timing and pin assignments. Make sure that the video card is compatible and that it is properly seated / installed on the computer.

DISPLAY AREA IS NOT CENTERED / SIZED CORRECTLY
Make sure that a supported video mode has been selected on the display, or on the video card / system. If it is impossible to position the image correctly, i.e. the image adjustment controls will not move the image far enough, then test it again using another graphics card for the PC system. This situation may occur with a custom graphics card that is not close to standard timings or if something is in the graphics line that may be affecting the signal, such as a signal splitter (please note that normally a signal splitter will not have any adverse effect). If it is impossible to change to the correct resolution/color depth, check if you have the right VGA driver installed in your system.

IMAGE APPEARANCE:
A faulty TFT panel can have black lines, pixel errors, failed sections, flickering or flashing image. Incorrect graphics card refresh rate, resolution or interlaced mode will probably cause the image to be the wrong size, it may scroll, flicker badly or possibly even no image is present. Sparkling on the display may be a faulty TFT panel signal cable, and it needs service attention.

RGB Signal Only: Horizontal interference can usually be corrected by adjusting the PHASE (OSD menu). Vertical interference can usually be corrected by adjusting the FREQUENCY (OSD menu).

DEW CONDENSATION BEHIND GLASS:
Note that this problem will not occur on bonded products. For non-bonded products, do the following:
Power on the TFT product and set brightness to 100%. Turn off any automatic screensavers on PC or similar. During minutes the dew will be gone. To speed up the process, use a fan heater for a reasonable time. Do not overheat the TFT product.

GENERAL ISSUES FOR COMPUTER BASED PRODUCTS

Note: Applies for a range of various products. This is only meant as a general guide.

CD-ROM FAILURE OR READ/DETECTION PROBLEMS:
If the product are operated/located in a area with extreme condensation, the CD/DVD drive may not work correctly due to condensation on the read head. Keep the product on for a while until it's reached normal operating temperature, and retry accessing discs. Otherwise, consider using USB memory sticks or alternative storage devices.

NO CD-ROM AVAILABLE ON YOUR PRODUCT FOR INSTALLING DRIVERS/SOFTWARE:
Please use USB memory sticks, USB Floppy drive, USB CD-Rom Drive or alternative storage devices to transfer/install software on CD-ROM-less units.

HATTELAND®
DISPLAY

Declaration of Conformity

We, manufacturer

Hatteland Display AS
Åmsosen, N-5578 Nedre Vats, Norway

declare under our sole responsibility that the JH MMD, JH MMC, JH STD, JH MIL, HM NMD, HM MIL, HM CMD, HT STD, HD MMD, HM MMD & HT MMC product ranges is in conformity with the following standards in accordance with the EMC Directive.

Low Voltage Directive 2006/95/EC
EN 60950

EMC Directive 2004/108/EC
EN 55022 Class A
EN 55024

Signature:.....
Frode Grindheim
Vice President Product Management
Nedre Vats, Norway

Signature:.....
Arne Kristiansen
Site Manager - Test & Commission Division
Oslo, Norway

CE

CE MARK FIRST AFFIXED DATE (11 March 2010)

IND100237-1

Return Of Goods Information

Return of goods:

(Applies not to warranty/normal service/repair of products)

Hatteland Display referenced as “manufacturer” in this document.

Before returning goods, please contact your system supplier before sending anything directly to manufacturer. When you return products after loan, test, evaulation or products subject for credit, you must ensure that all accessories received from our warehouse is returned. This applies to cables, powermodules and additional equipment except screws or similar, user manual, datasheets or other written paper documents. Furthermore, the product must not have any minor / medium or severe scratches, chemical spills or similar on the backcover, front frame or glass.

This is needed to credit the invoice 100%. Missing parts will not be subject for credit, and you will not get total credit for returned product. You will either be charged separately or the amount is withdrawn from the credit. If you decide to ship the missing items on the after hand, you will get 100% credit for that particular invoice or items received at manufacturer incoming goods control. Please contact our service/sales department if additional questions

Approved packaging methods/materials:

(Applies to all shipments to manufacturer)

When returning goods, please make sure you surround the product with the following material, whenever possible: Original packaging from manufacturer, firm foam material, bubble wrap or lots of PadPack paper or Foam chips/polyester wrapped in sealed plastic bags. In any case, always use a solid cardboard box to surround everything.

Not approved packaging methods/materials are: Foam chips, expanded polyester, clothes, nothing, or too little, or anything that will crumble and get into the ventilation holes of products and cardboard boxes that are not suitable to secure the product during shipment.

Terms Of Sale And Delivery

1) APPLICATION
The terms of sale and delivery apply for Hatteland Display.

2) PRICE

a) The price is per each, if nothing else has been stated, VAT not included. Price is based on the prices from our suppliers, current custom rates, taxes, rate of exchange and international raw material prices. We reserve ourselves the rights to adjustments in case of alternation on the above mentioned.

b) Included in the price is the supplier's standard packing. In case of re-packing/smaller quantities we reserve ourselves the right to add an additional sum for warrantable packing according to CECC 0015 (Basic inspection for protection of electrostatic sensitive devices)

3) VALIDITY
If nothing else has been stated in our quotation, the offer is valid for 30 days from the date of quotation.

4) PACKAGE QUOTATION
A package quotation means that all the components offered, must be ordered by us. If one component or more are removed from the quotation, the prices given in the package quotation are not valid.

5) TERMS OF PAYMENT
Cash on delivery or payment in advance. Net granted for companies, schools and institutions only, according to agreement. In case of too late payment 1.5% interest/month will be charged. Seller has mortage rights in the goods delivered until the purchase price, additional interests and charges have been paid in full. Accepted bill is not considered as payment until it has been honoured in full.

6) TIME OF DELIVERY
The quoted time of delivery is based on information from our suppliers. We disclaim any responsibility for the consequences of any delay or cancellation from our suppliers. Belated delivery gives not solely the right for cancellation.

7) DELIVERY POINT OF TIME
Goods are considered delivered to customer when handed over to charterer.

8) FREIGHT / PACKING / FORWARDING FEE
Hatteland Display AS charge NOK 50,- in forwarding fee for orders below NOK 1000,-.
Freight charge according to expenses for orders above NOK 1000,-. VAT not included.

9) COMPLAINT
By receipt customer must check goods for obvious defects which have to be claimed within 8 days from receipt. Otherwise acceptance of complaint can not be counted on.

10) GUARANTEE / SERVICES
Time of guarantee is calculated from our date of shipment, and applies to the extent that we are covered by our supplier's guarantee regulations. The guarantee does no longer apply if:

I) there has been encroached upon the goods without seller's consent
II) terms of payment is not fulfilled
III) the goods have been damaged due to unskilled treatment
IV) components which are sensitive for static electricity have not been unpacked and treated in a secure way.

Minimum requirements: CECC 00015's standards for handling of such components. The guarantee does not include fair wear and tear.

11) RESPONSIBLITY
Seller undertake to deliver faultless and functional capable goods according to existing technical specifications. Seller disclaim responsibility for any damage or loss which directly or indirectly may be caused due to failure or defect with the delivered goods, if carelessness from the seller can be limited up to the cost of the goods. The supplier's responsibility for defects with the supplied goods do not include secondary damage or loss.

12) CANCELLATION / RETURN
Binding sales contract is concluded when we have confirmed customer's purchase order. Any disagreements in our order confirmation must be reported to seller within 6 days. The agreement can not be altered without our permission, after acceptance from our supplier. If goods are wanted to be returned, a Return No must be assigned from seller. Returned goods without a Return No will not be accepted. By return of stock listed goods, 20% return fee is charged. Returned goods are shipped on customer's account and risk.

13) LOAN, RENT and DEMO
When borrowing of goods for demo/test, the date of return must be added to the document. If no date has been stated, date of return is two weeks from the date of the document. Before return, seller must be contacted for a Return No (RTK). Goods which have been sold with an agreed right of return within stated terms, shall also have a Return No. The Return No must be obtained before the stated date of return. Returned goods without a Return No, or which have not been packed in original packing, will not be accepted.

14) LIMITATIONS
If any of our suppliers claim limited delivery terms towards us, our terms of delivery will be restricted according to those.

15) SOFTWARE
Sold or borrowed software is not allowed to be copied or spread in other ways, without a written permission.

16) RE-EXPORT
Goods delivered from seller may be subject to special rules of exportation in their supplier's native country. Buyer is responsible to obtain necessary permissions for further export/re-sale.

17) QUESTION IN DISPUTE
To settle any dispute the Karmsund Herredsrett is approved the legal venue.

INSTRUCTIONS FOR THE CONSIGNEE

1) CONTROL
Control the goods immediately by receipt. Examine the quantity towards the invoice/packinglist/shipping documents. Look for outward defects on the packing which may indicate damage on or loss of contents. Control the container and the seals for any defects.

2) SECURING EVIDENCE
When defects on the goods have been found, evidence must be secured, and seller must be informed. Call the transporter and point out the defects. Add a description of the defects on the goods receipt, the forwarder's copy of the way-bill or on the driving slip.

3) RESCUE
Bound the damage. Try to restrict the damage and the loss. Seller will compensate expences incurred due to reasonable security efforts in addition to damage and loss.

4) COMPLAINT
Write immediately a complaint to the transporter or his agent. Forward immediately the complaint to the transporter or his agent, and hold the transporter responsible for the defects. The complaint must be sent at the latest:

- for carriage by sea: within 3 days
- for overland / air transportation within 7 days

5) DOCUMENTATION
For any claims the following documentation is required, and must be forwared to the company or their agent: invoice, way-bill and/or bill of landing, and/or statement of arrival, inspection document, besides a copy of the letter of complaint to the transporter.

Pixel Defect Policy

PIXEL DEFECT POLICY

Dot-defects (Bright or dark spots on the panel)

Due to the effect that dot failures are part of the TFT technology such failure occurrence cannot be prevented basically. Even though dot defects usually occur during production process, new defects can appear within the lifespan of a TFT display. Neither the production at LCD-supplier nor the use of a LCD-Monitor after shipment can be influenced by Hatteland Display. Hence Hatteland Display cannot be made responsible for such dot failures. However Hatteland Display understand and accepts the responsibility towards the customers for the delivery of new displays, therefore accepts a limitation on dot defect's occurrence on new displays delivered to the customer.

PRINCIPLES

a. One pixel consists of 3 dots (Red, Green and Blue)

b. Dot defects are differentiated between:
- Bright dot defects: Spot on the panel appear as pixels or sub pixels that are always lit. Non-extinguishing dot.
- Dark dot defects: Spot on the panel appear as pixels or sub pixels that are always dark (off). Non-lightening dot.

c. Inspector observes the LCD from normal direction at a distance of 50cm above the worktable. Dark dots are counted under entire white screen. Bright dots are counted under entire black screen.

d. Dot failures within tolerances below do not qualify for warranty claims.

PIXEL DEFECT TOLERANCES

Bright dot	≤ 4 dots
Two adjacent bright dots *	≤ 2
Distance between 2 dot defects *	≥ 15mm
Dark dots	≤ 8
Total number of bright or dark dot defects. *	≤ 8

* 1 or 2 adjacent dot defects considered as 1 defect.

EXTRAORDINARY CIRCUMSTANCES

Possible cases which cannot be influenced either by customer or Hatteland Display.

Examples for extraordinary circumstances:
- Allocation from LCD-Supplier
- Outstanding high number of LCD-panels with bright dots but within LCD-suppliers Specification.
- Sharply increased demand by customer

In such cases a mutual agreement is inevitable.

Examples:
- Acceptance of bright dots in "non-critical" display areas.
- Acceptance of bright dots with defined color.

Last Revised July 2007

Notes

General Notes: (For all products)

- Other type approvals applies for the different products.
  Please see **Testing & Approvals Overview** section in this manual for more information.

- Use of brightness and push buttons may inhibit visibility of information at night.

Note for ECDIS Systems:

For ECDIS systems the brightness knob indication mark should be aligned directly with the indication mark located on the label. (See Physical Overview or Operation section elsewhere in this manual)

VGA BIOS Firmware Verify: (On MMD and similar products only)

To verify your BIOS Firmware version, the version number is displayed in the UTILITIES menu in the right top corner. If no version number shows, you may have a BIOS Firmware below V1.00

This manual currently applies for these BIOS Firmware Versions:

V0.xx / V1.00 / V1.10 / V1.2 / V1.2xx / V1.3xx / V1.5xx / V1.6xx / V2.0xx

V0.xx through V1.6xx (Introduced/used in early 2001 to 2006) - V2.0xx (Introduced late 2006)

As the available functions are nearly indentical between older products and V1.6xx, there should be no critical need to update the BIOS Firmware (revision V0.xx and up to V1.6xx). In such case, consult your local technician or sales/technical personnel at Hatteland Display if problems arise during the installation, upon usage of the product or lack of support for your signal refresh rate etc. For certain versions the entire graphical board must be changed by a qualified Hatteland technician or a representative. A BIOS software upgrade is not possible.

VGA BIOS Firmware Versions: (On MMD and similar products only)

On products: V0.xx to V1.1xx = The **advanced** version of the OSD menu by startup default.
On products: V1.2xx to V1.5xx = The **simplified** version of the OSD menu by startup default.
On products: V1.6xx and up = The **memorized state** version of the OSD menu by startup default.

Advanced/Service Menu:

You will have a full set of functions available for your personal perference. Only for experienced users.

Simplified/User Menu:

You will have a limited set of functions available for your personal perference. For the common user.

Memorized State Menu: (Also referenced as “Normal/Toggle”)

The menu will either be advanced or simplified upon startup of display. If user changes from simplified to advanced menu or visa versa, then this will be memorized in memory and it stays in that mode until user changes it back again. This is only active on VGA BIOS Firmware versions from V1.6xx and up.

Notes

Revision History

Rev.	By	Date	Notes
1	SE	12 Feb 04	First release, User Manual. Pressed & internet version.
2	SE	18 Mar 04	Updated EMI test specifications and datasheets.
3	SE	28 Apr 04	Added Declaration Of Confirmity Added Book ID on all pages, and minor maintenance.
4	SE	12 Nov 04	Updated JH 20T04 MIL drawing
5	SE	24 Jan 05	Updated RS-232 Interface Command Table
6	SE	07 Mar 06	Overall update.
7	SE	22 Jun 06	Minor relocation of chapters.
8	SE	13 Dec 06	Revised OnScreenDisplay (OSD) menu chapter from SV1280DVI / SV1600DVI to JH1600. (V2.0xx) Several new functions: (Sharpness, PIP Size 1-24, Languages, OSD Mode, Setup DDC & Serial Adress). Obsolete functions was removed: (Volume & Component Video) Minor relocation of OSD functions and textual changes in OSD menu explanations.
9	SE	17 Jul 07	Testing and Approval section now merged with Specifications section Added Technical Drawings for 19,20 and 23 inch VESA Bracket, Sun Visors and Water Covers General revision of text elements.
10	SE AK TØ BQ	26 Mar 08	Revised installation chapter. (goose neck-light paragraph) Revised touch screen chapter. Driver CD added to contents of package. Added “Pixel Defect Policy” section in appendix chapter. Revised company profile text and contents of package sections. Removed JH 20T04 MIL specifications and technical drawings (obsolete product Q1 2008)
11	SE	01 Jul 08	Revised company profile and company related text. Various small text changes throughout manual where needed. Added HM 20T07 MIL specifications and drawings, and also separated the JH MIL and HM MIL products from each other graphically and textwise where needed. Added pin out assignments for RS-422 and RS-485.
12	SE	18 Nov 08	Revised general chapter. Added inches to drawings and specifications text.
13	SE	08 Jan 09	Revised specifications for HM 20T07 MIL
14	SE	26 Jan 09	Revised specifications (Type Approval ClassNK)
15	SE PM	26 Feb 09	Revised specifcations for 23 inch. (No DC model is available or valid) Type Approval HM 20T07 MIL (DNV)
16	SE BQ	17 Apr 09	Removed HM 20T07 MIL spec and drawings (now available in own separate manual INB100005-8)
17	SE EO	11 Jun 09	Added -F1 typenumber to frontpage list.
18	PT SE	15 Apr 2010	Removed obsolete, non-relevant typenumber references (page 1) Changed serial cable text and graphics only from “male-male” to “male-female”. Cable shipped with product is “male-female” (page 6) Added MIL Qualified / Naval Military - Introduction page 9. Added Rotary and Mounting Bracket assembly/disassembly page 19 Removed JH 19T01 MIL & JH 23T02 MIL specifications and drawings. Products obsolete, ref: http://www.hatteland-display.com/mails/18_2009_eol.html
19	JE SE	08 Mar 2011	Removed all reference to -Ex typenumbers (page 1,35) Updated company related text (page 1,8) Revised Contents of Package chapter (user manual/documentation DVD) page 6 Revised Touch Screen information to show Capacitive only (page 11) Revised Touch Screen Driver information (page 12) Added color indication to RGBHV connectors text (page 20)